The Electrical Industry's Weekly Magazine

October 16, 1961

Electrical World

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A McGraw-Hill Publication

Electrical World

ELECTRIC HEATING CONFERENCE

SHERATON-PARK HOTEL
WASHINGTON, D.C.

SEPTEMBER 25-26, 1961

PROGRAM

Merged Industry Effort Is Vital to Capture Heating Load

...page 39

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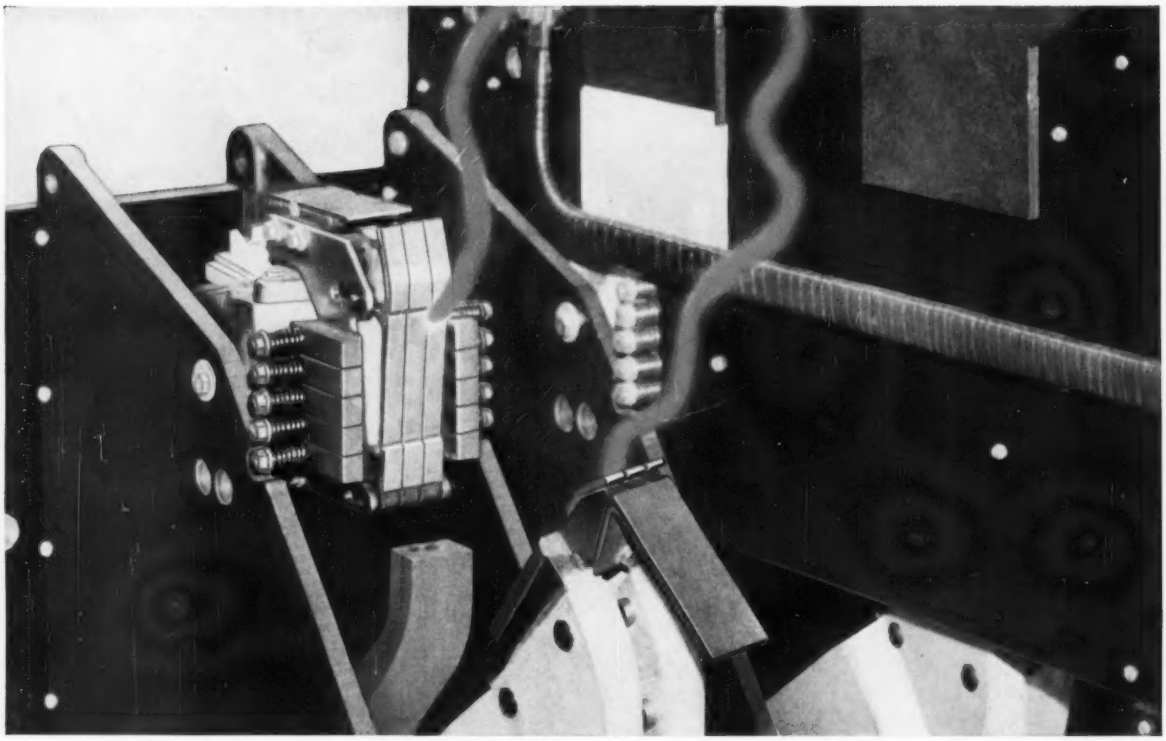

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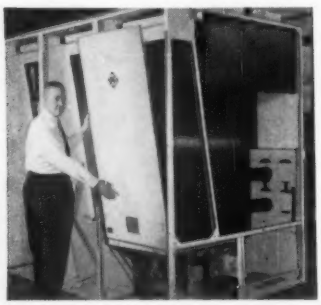
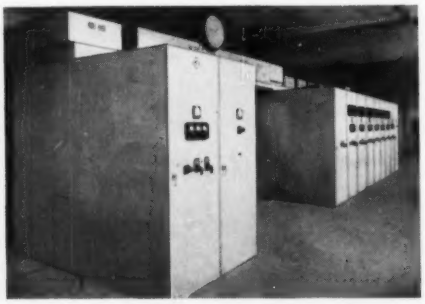


Tilted front steel barrier locks with cubicle to protect operator.



15-kv indoor metal-clad switchgear installed in a western utility.

Ruptair and *Shelter-Clad* are Allis-Chalmers trademarks.

Published for 87 years for those engaged in the business of generating, transmitting, distributing or applying electric power

Electrical World

October 16, 1961
Vol. 156, No. 16

Dateline . . .

Oregon Cities Squabble Over Service Area

Eugene, Ore.—Two Oregon municipal electric systems, the Eugene Water & Electric Board and the Springfield Utility Board, are feuding over which has the right to acquire Pacific Power & Light Co facilities in an area north of Springfield's present service area.

The PP&L facilities were part of the package Springfield voters have twice refused to purchase. Now EWEB has proposed buying the PP&L facilities along with others in rural and suburban areas surrounding Eugene.

Eugene bases its right to serve the territory on a 1949 agreement with the smaller electric system of neighboring Springfield. The agreement gives EWEB prior rights to serve in the area north of Springfield's Q Street, which in 1949 was Springfield's northern boundary.

Springfield in 1960 annexed territory beyond Q Street and now feels the 1949 agreement was based on conditions which no longer exist. The SUB now charges that EWEB, by offering to buy the PP&L facilities serving some 900 electric customers in the area, is encroaching on Springfield's "natural area of expansion."

Springfield wants to try again to buy out PP&L, which competes with the municipal system throughout Springfield, and has asked the investor-owned utility if it will keep the price for acquistion of its Springfield facilities at the same level. Last June Springfield voters rejected by a narrow margin a $3.9-million bond issue to buy out PP&L.

The situation is further muddled by the fact that the 1949 agreement provides that Springfield can acquire EWEB properties in east Springfield serving 900 customers at a figure said by Byron Price, EWEB superintendent, to be only one-third to one-half of fair market value.

(*Continued on page 5*)

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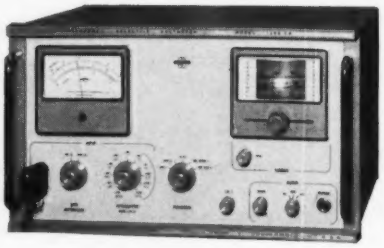

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Dateline . . .

Eugene, Ore. (*Continued from page* 3)

Springfield has never moved to take over these properties. Its dilemma: The 900 EWEB customers are served at lower rates by EWEB than they would be by SUB, so, as Springfield voters, they are not likely to favor an acquisition bond issue that would increase their electric rates.

Already the east Springfield voters served by a foreign municipality have pricked the SUB. Last June the area turned in a 322-to-110 vote against the bond issue to purchase the PP&L property and are credited with the issue's defeat.

To get around the east Springfield dilemma, SUB has voted to conduct a rate study to determine whether it is feasible to lower its rates to match those of Eugene.

Springfield is also preparing a proposed admendment to the 1949 agreement which would give Springfield rather than Eugene priority in serving the growing suburban area north of Springfield. Jack Criswell, SUB superintendent, has called the disputed area "the cream of the power package" of total PP&L facilities Springfield eventually hopes to purchase.

Pacific Power & Light is staying discreetly out of the controversy.

"We are not getting mixed up in any controversy as to who is entitled to service this area," said George Bragg, PP&L general manager.

Price said Eugene is willing to consider "any reasonable proposal" from Springfield. He said EWEB wishes to file a territorial service agreement, under provisions of a state law passed by the 1961 legislature, with the Oregon Public Utilities Commissioner.

"Our whole purpose is to arrive at mutually-agreed service boundaries with adjacent utilities and file these agreements with the PUC so there won't be any question about administration of these contracts," said Price.

Letters

Demand Charge for Distribution Losses?

To the Editor:

The article "Economic Conductor Sizing Offers Distribution Savings" by F. F. Gray in Sept. 25 *Electrical World* was particularly interesting since it is reminiscent of many studies in this field at Detroit Edison Co some 30 years or more ago.

Although good savings can, unquestionably, be made by proper conductor sizing, considerable care is necessary that these be real and not theoretical. In this connection, I question Mr Gray's use of the demand component in determining the cost of energy losses. He recognizes the possible argument against this, but justifies it by the total amount of peak load loss, 48,800 kw. If this loss could all be eliminated, there might, of course, be an appreciable effect on the investment in generation and transmission. The possible reductions in loss, however, are probably not more than 10 to 15% of the total—he gives 5,300 kw.

Generators are usually added to big systems in units of 100 Mw or larger. Scheduling is based on load estimates made three to five years ahead, and includes considerations of reserve and maintenance schedules. Relatively small variations in load will, therefore, make no appreciable difference in the size of unit or the date it goes into service.

The demand element in the cost of energy losses is a major one—of the order of 70% of the total. This would lead to a larger conductor than if the energy component only were considered. I would caution that unless the additional expenditure can be factually justified, there may result a decidedly uneconomical situation in which more dollars are spent on distribution with no resultant savings in generation or transmission.

Howard P. Seelye
331 Suwanee Ave
Sarasota, Fla.

▶The distribution engineer has always been plagued with this conflict when he strives for economy in substations, primary circuits, distribution transformers, and secondaries. Is it possible that a reduction of losses in all these components might total enough to justify credit for the system capacity released?

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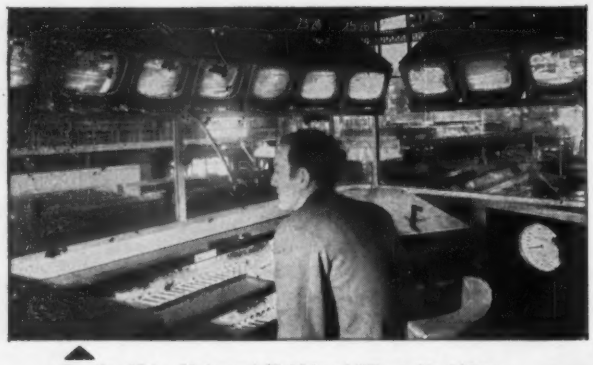
The Sir Adam Beck-Niagara Pumping-Generating Station in Canada incorporates six 'ENGLISH ELECTRIC' Dériaz variable pitch reversible pump/turbines. Each is rated at 45,500 h.p. as a turbine under 83 ft. head, and will discharge as a pump 4,000 to 5,000 cubic feet per second under heads from 59 to 90 ft. The pump/turbines, of a new basic design developed by 'ENGLISH ELECTRIC' in England, were supplied to the Hydro-Electric Power Commission of Ontario by English Electric Canada, a division of John Inglis Co. Ltd., and manufactured at Toronto. This illustration shows a runner hub assembly at the John Inglis plant.



On the 45-in. Universal Slabbing Mill at the Abbey Works of The Steel Company of Wales, the ingots are transferred from soaking pits to the mill by means of electrically driven rail cars. The drives and remote control scheme were engineered and supplied by 'ENGLISH ELECTRIC'. With the aid of fifteen television cameras and monitors in a closed circuit system, designed and installed by Marconi's Wireless Telegraph Co. Ltd., the operator is able to follow every stage of the operation and to control the vehicles with speed and accuracy.

The 'ENGLISH ELECTRIC' Deltic locomotive, powered by two 1,650 h.p. Napier Deltic diesel engines is the most powerful single-unit diesel-electric locomotive in the world. Twenty-two of these 3,300 h.p. locomotives are being built by Vulcan Foundry for British Railways.

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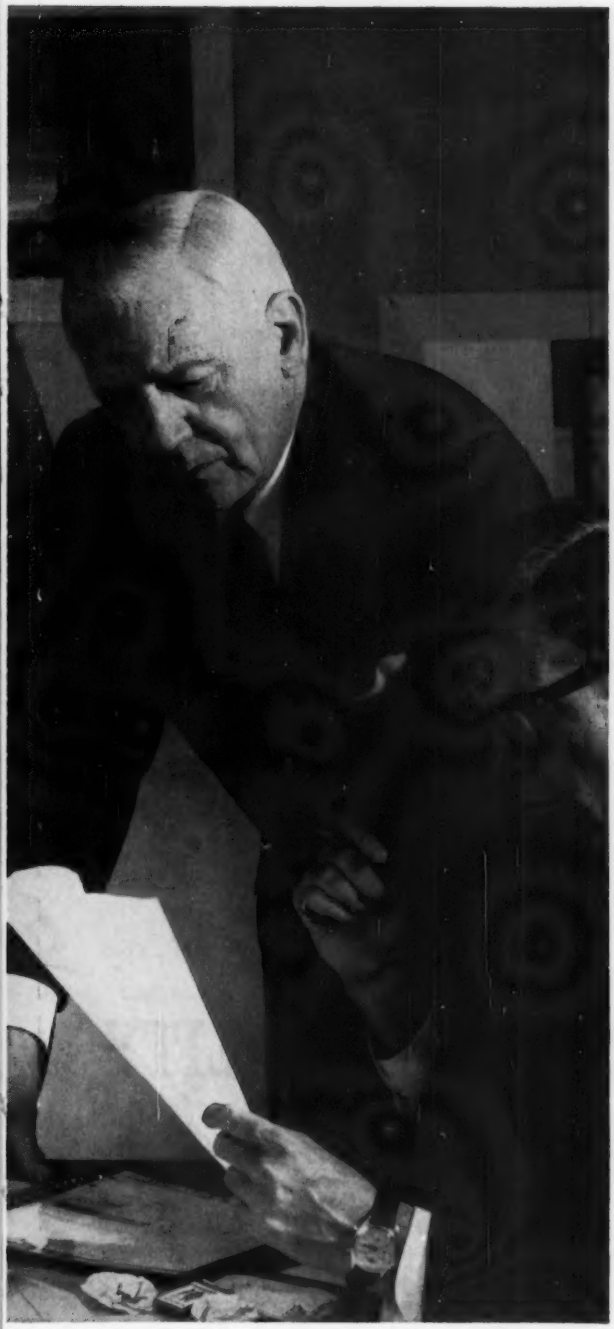
to install and maintain distribution transformers, then it's important you consider Moloney!



Because Moloney's philosophy of "Total Design" puts balanced performance into a transformer to provide better value over the long pull!

You have to know that transformers will give dependable service day after day, year in, year out. This means *satisfied customers* . . . fewer maintenance headaches. Therefore, Moloney's "Total Design" Distribution Transformer is important to you. For example, features such as the Duracoat insulated covers . . . full short circuit strength . . . high-strength long-creep bushings . . . exemplify design characteristics incorporated in Moloney Distribution Transformers with one goal: the greatest possible protection against all the hazards of transformer operation compatible with high performance and minimum operating cost.

If it's your responsibility to specify distribution transformers, then it's important you consider Moloney's "Total Design" Distribution Transformers.

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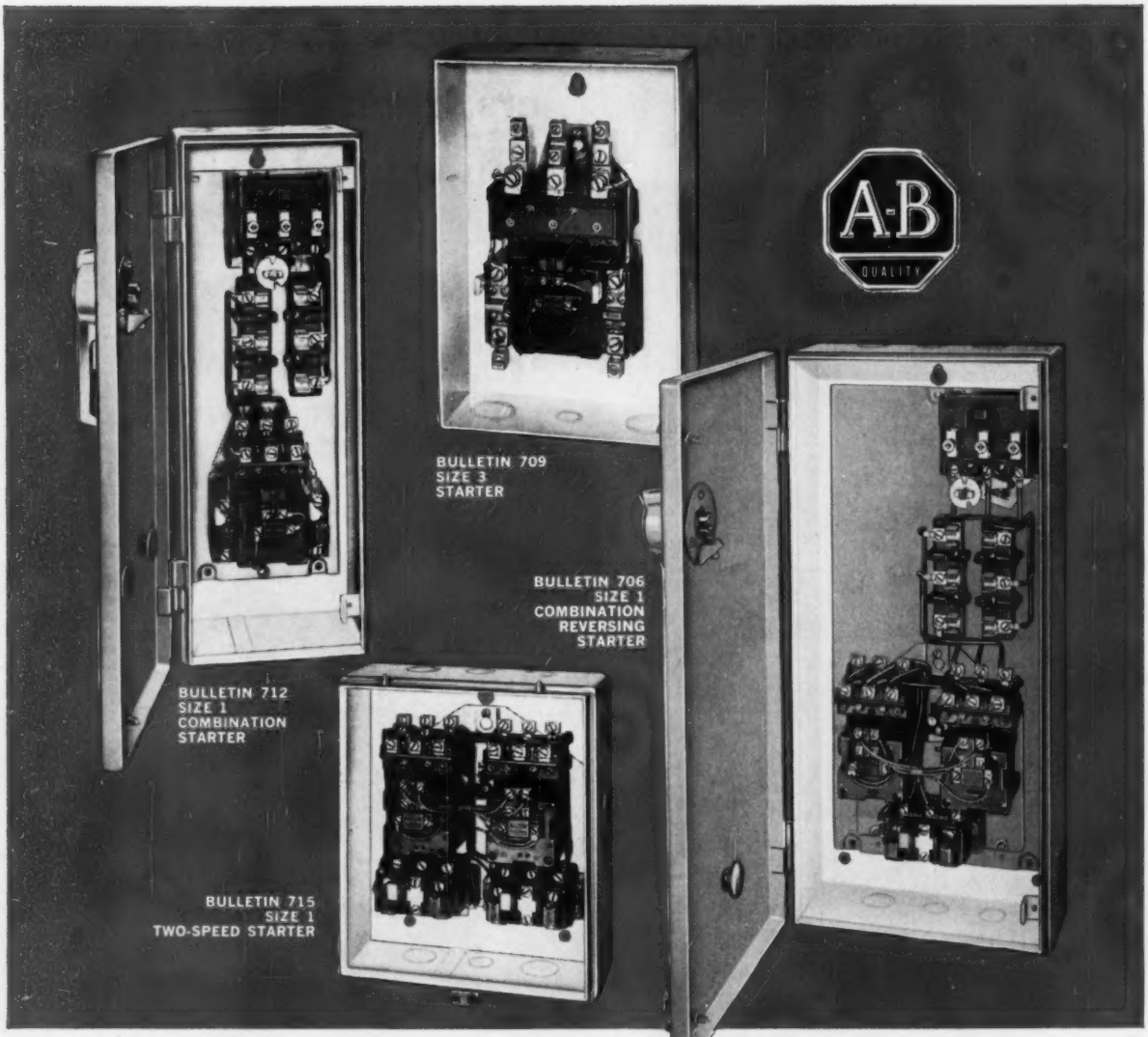

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Electrical World

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ELECTRIC UTILITY METHODS report is highlight of next week's issue.

LATE NEWS ▶

The question of generation at Hanford is still alive. Agreement is reached to "explore every possible avenue" by Bonneville Power Administration, Atomic Energy Commission, and Washington Department of Conservation. Earl Coe, state director of conservation, says: "The cooperative attitude of the two federal agencies has encouraged me to pursue studies of the feasibility of Washington state financing and constructing the project."

McGraw-Edison announces new modified kraft insulation, "TherMEcel." Line Material says it will use it in distribution transformers under name of "Duralem."

More changes in Federal Power Commission membership are foreseen as Howard Morgan begins talking about running for Oregon governorship. Also, the resignation of Jerome Kuykendall has been accepted by the White House.

A major water development plan for eight rivers in Texas is announced by the US Study Commission—Texas. Plan is for 30 water storage reservoirs by 1975; a total of 83 by the year 2010. Power generation is proposed for 14 to be built between 1975 and 2010. Total development cost is estimated at $1.1 billion. About 2.5 million acre-ft of storage would be for generation.

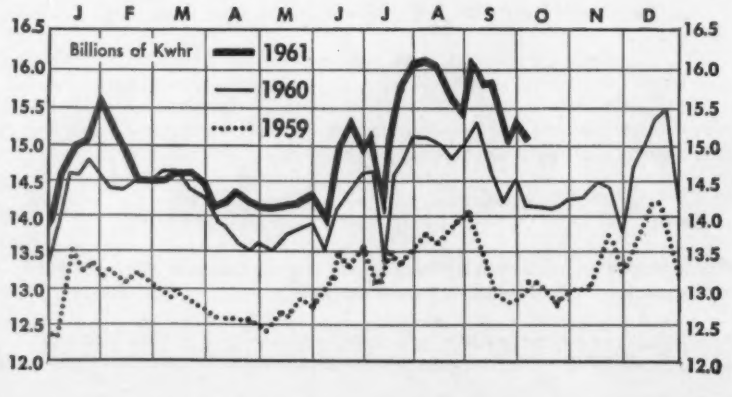
Eugene C. Starr resigns as chief engineer of Bonneville Power Administration effective Oct. 30 for "reasons of a personal nature." E. L. White, deputy chief engineer, will take over until Starr's successor is chosen.

General Accounting Office agrees to make a study of Allis-Chalmers' contention that Baldwin-Lima-Hamilton should not be awarded a contract for building 15 hydraulic turbines for the John Day and Lower Monumental projects of the Corps of Engineers. Contract award is held up until question is settled.

Four more investor-owned electric utilities file antitrust damage suits against electrical manufacturers. Companies filing the actions in Chicago are: Central Illinois Light, Iowa-Illinois G&E, Iowa P&L, and Iowa Electric L&P. The companies say that complaints with respect to ten additional items "probably will be filed within the next several weeks." This is the third group of investor-owned utilities to file suits.

The right to cut the number of defendants in damage suits resulting from the Philadelphia antitrust cases has been granted Los Angeles Department of Water & Power by a federal district judge. He ruled there was no basis to General Electric objections that a public body has a higher duty to act reasonably without pure caprice than an individual.

WEEKLY POWER OUTPUT—Up 6.6% (Week ending Oct. 7), Kwhr 15,035,000,000



Per Cent Change From Previous Year

	Sept. 23	Sept. 30	Oct. 7
Total U.S.	+ 3.2	+ 8.3	+ 6.6
New Eng.	+ 8.5	+ 9.1	+ 9.5
Mid. Atlan. ...	+ 7.9	+ 6.6	+ 7.9
Cent. Indust. ..	+ 4.4	+ 5.2	+ 5.0
West. Cent.....	+ 2.7	+ 7.2	+ 7.6
Southeast	+ 4.5	+10.7	+ 8.0
South Cent.....	−12.9	+19.3	+ 0.2
Rocky Mount...	+ 1.9	+ 2.2	+ 4.3
Pacific			
NW	+ 3.0	+ 5.8	+ 7.2
SW	+ 6.7	+ 7.9	+10.2

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Source: Edison Electric Institute

Supply Lines

PRICES, ANTITRUST, AND TRADE ARE TOPICS AT CEMA MEETING

Price wars, price fixing, and the rapidly changing world trade picture were recurring topics of conversation among the 600 executives attending the Canadian Electrical Manufacturers Assn's annual convention at Niagara Falls, Ontario, Oct. 4-6. The problems are complex and often in a state of flux, so that precise conclusions were hard to find.

The probable entry of the United Kingdom into the European Common Market is a case in point. Undoubtedly, this action will affect total trade between Canada and the UK. Just as certainly, it will affect Canadian electrical manufacturers. Precisely how, no one seemed to know. The best that CEMA experts on this topic could say was that, in the long run, Canada and its electrical manufacturing industry would benefit, because the stronger the UK becomes economically (which would supposedly come out of its Common Market membership), the better this would be for Canada and its industries.

Price fixing is another case in point. The US manufacturers' Philadelphia antitrust troubles caused reverberations throughout Canada, mainly because the Canadian public thought that what happened south of the border must also be happening there in Canada, especially when one considered the heavy amount of US ownership of the Canadian electrical manufacturing industry.

Naturally, CEMA members don't like this automatic guilt-by-association. But what to do about it is another matter. This past year's CEMA president, J. W. Kerr, also president of Triangle Conduit & Cable (Canada) Ltd, said the Philadelphia situation was always coming up at CEMA board meetings, but that so far, no formal public relations program had been instituted for combating this unexpected Canadian reaction. He added that such a program could very well be found necessary in the near future.

Finally, there is the almost perpetual problem of low prices and low profits. Here, CEMA members appear to have a clearer idea of what can be done. Last year, after-tax profits as a percent of sales dipped to a new low, 2.3%. At the same time, one company out of every five in the industry lost money during 1960. To some CEMA members, the problem is so severe that they wonder whether the time is not soon approaching when the industry will not be able to generate enough capital to develop products and modernize its plant in order to remain competitive in the world market.

The reasons for this extreme competitiveness are overcapacity, foreign competition, and a somewhat slack demand for their products going hand in hand with a slack overall economy. To meet some of these causes and effects, the manufacturers are modernizing plant whenever possible. Also, CEMA is still trying to get the Ottawa government to help out on the import problem. There is also a keen interest in developing exports to alleviate the overcapacity problem.

CEMA members are looking for a change in the government's antitrust attitude. At least that is one of the things the new CEMA president would like to work on this year. He is Thomas Edmondson, president of Ferranti-Packard Electric Ltd. While he considers the over-all public relations of the industry his main presidential concern, he is hoping also to convince the public and the lawmakers that a change in antitrust attitude is needed.

Apparently, Edmondson, along with other executives present, was much impressed

with a speech taking the Canadian government to task for its administration of the antitrust laws, which are similar in effect to US laws. In his speech, D. E. Armstrong, director of McGill University's School of Commerce, said that the laws work well during times of increasing demand by preventing price agreements from becoming explicit. But in times of stagnation, they work badly, which is to the further detriment of the Canadian economy. This speech will be explored more thoroughly next week.

MORE PRICE CHANGES ANNOUNCED

Moloney Electric Co says it is increasing the prices of its power transformers. The company adds that it "feels that an increase is long overdue in view of the increase in costs over the past two years." The Moloney announcement is in response to a 6% increase of power transformer prices by General Electric Co, on which two other manufacturers have already commented (EW, Oct. 9, pp 14, 16).

On the same subject, Pennsylvania Transformer has this to say: "Prices for power transformers have been so depressed that good business practices dictate every possible expense reduction. Yet we feel a severe reduction or the elimination of R&D expenses does not appear to be the best long-range interests of the electrical industry. How long this policy can be maintained at present low price levels is a moot point. We intend to continue to be competitive in the marketplace, on the up side as well as on the down side."

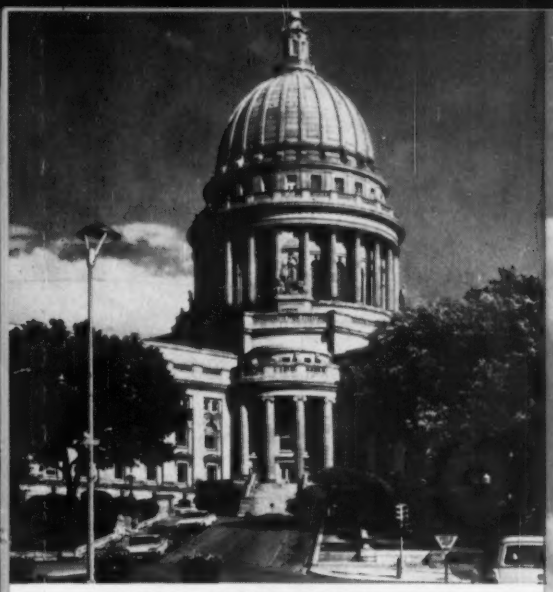
Also on October 2, Line Material Industries reduced distribution transformer prices by these approximate percentages: for 2,400 thru 4,800 v, 37.5 kva by 3%, and 75 kva by 2%. For 7,200 thru 14,400 v, 37.5 kva by 7%, 75 kva by 4%.

Meanwhile, the GE low voltage switchgear department has also announced some price increases, effective Oct. 2. Low voltage drawout and stationary switchgear prices have been increased 6%. Where drawout switchgear is associated with load center unit substations, there are other price increases of 6% for the transformers and 15% for incoming line air switches. Power circuit breakers and LB-1 protectors have also been increased 6%. The reason stated is the same as for the power transformer move: The increases "reflect an upward minor adjustment to maintain continued product innovation and improvement."

SUPREME COURT MAY DECIDE 'UNREASONABLY LOW PRICE' CONTROVERSY

The US Supreme Court last week agreed to consider whether the "unreasonably low price" clause of the Robinson-Patman Act is unconstitutional. The Court's decision could affect current negotiations between the Justice Department and General Electric over a similar clause in pending civil antitrust consent decrees.

The opportunity to rule on this law arose in a government complaint that National Dairy Products Corp was selling milk in the Kansas City, Mo., area below cost with the purpose of destroying competition. A federal district judge ruled that the "unreasonably low price" clause was so vague and indefinite that it was unconstitutional. The Justice Department has appealed this ruling to the Supreme Court and it is this appeal that the Court decided it would hear. Argument will be held shortly on the case.



ADDED BEAUTY FOR LOCATIONS like this. The Styled Mercury unit directs the light downwards and eliminates glare. It illuminates 11,000 square feet to 3 footcandles. You need fewer and shorter poles, and less wiring, to get the desired level of light.

ANOTHER IN THE FAMILY of modern Styled Mercury luminaires. The entire line is all-aluminum, with Holophane® refractor. Choice of 1000, 700 or 400 watt ratings. Available in choice of brushed aluminum finish or five decorator colors.

FOUR OF THE LATEST design units provide excellent nighttime illumination for traffic and pedestrians on this busy street in a shopping section.

L-M Announces Another Graceful Design In The New Styled Mercury Light Family

Line Material's Styled Mercury luminaires are a family of high quality, high intensity lighting units. The latest addition to the Styled Mercury line is the upsweep design installed in the well-lighted street shown above.

These are large, handsome luminaires, styled for Line Material by a noted industrial designer. They will contribute daytime beauty and excellent nighttime lighting to any street, park, mall, public square, or parking area.

Line Material is a leading manufacturer of outdoor lighting with 50 years' experience in the design and application of street and highway luminaires. L-M also provides competent Lighting Application Service by experienced lighting engineers.

MAIL COUPON FOR BULLETINS

Ask the L-M Lighting Engineer or Field Engineer for bulletins, or mail the coupon.

OUR 50TH YEAR 1911 — 1961

LINE MATERIAL® Industries

McGRAW-EDISON COMPANY

Outdoor Lighting

McGRAW EDISON

522

DISTRIBUTION TRANSFORMERS · RECLOSERS, SECTIONALIZERS AND OIL SWITCHES
FUSE CUTOUTS AND FUSE LINKS · LIGHTNING ARRESTERS · POWER SWITCHING EQUIPMENT
PACKAGED SUBSTATIONS · CAPACITORS · REGULATORS · OUTDOOR LIGHTING
LINE CONSTRUCTION MATERIALS · PORCELAIN INSULATORS · FIBRE PIPE AND CONDUIT

Line Material Industries, Milwaukee 1, Wisconsin

Please send me details on L-M Styled Mercury family of luminaires and the new units. EW-1016

Name_____

Company_____

Address_____

City_____ State_____

Type of Area To Be Lighted_____

LINE MATERIAL FINDS "A BETTER WAY"

Close-up of Peltier thermoelectric device. Spring tension on the heat pumps automatically adjusts the device to different lamp bulb diameters. Can be used with any T12 through T17 lamp. L-M's Peltier device is presently available only for 6-foot, 4-lamp shallow luminaires.

This six-foot, four-lamp shallow luminaire utilizes four L-M Peltier thermoelectric heat pumps for spot-cooling the fluorescent lamps. In the heat pump, direct current flows through a series of junctions of dissimilar metals, alternately absorbing heat in one junction and liberating heat in the other. The cold junctions contact approximately one-half square inch on the lamp bulb walls thereby maintaining the mercury vapor pressure within the lamps at the optimum value for maximum light output.

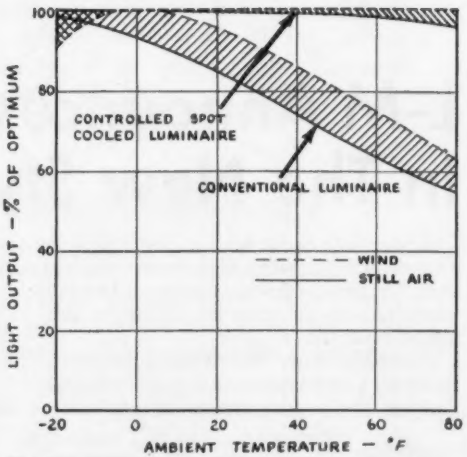
L-M's Revolutionary New Development Keeps Fluorescent Output at Maximum

by **STACY STANDLEY,**
Product Manager, Lighting
Line Material Industries

Now—Line Material develops another important engineering advance in outdoor lighting—Thermoelectrically Cooled Fluorescent Luminaires. These luminaires solve the basic problem of fluorescent lamp lumen output variation caused by ambient temperature changes. Another vital contribution by Line Material Industries to better outdoor lighting.

L-M Lighting Development Engineers have ingeniously adapted the Peltier thermoelectric principle to spot-cool fluorescent lamps. By the simple process of cooling a small area of each lamp, internal mercury pressure is held at the optimum and light output is maximized regardless of ambient temperature.

Be sure you get complete information on L-M's latest contribution. Contact your L-M Lighting Engineer, or write direct to Line Material Industries, Outdoor Lighting, Milwaukee 1, Wisconsin. In Canada: CLM Industries, McGraw-Edison (Canada) Limited, Toronto 13, Canada.



Performance curves of luminaires with and without controlled spot cooling: solid edge of band represents still-air conditions, dotted line represents 10 MPH of wind.

LINE MATERIAL® Industries Outdoor Lighting
McGRAW-EDISON COMPANY

McGRAW-EDISON

DISTRIBUTION TRANSFORMERS • RECLOSERS, SECTIONALIZERS AND OIL SWITCHES • FUSE CUTOUTS AND FUSE LINKS • LIGHTNING ARRESTERS • POWER SWITCHING EQUIPMENT
PACKAGED SUBSTATIONS • CAPACITORS • REGULATORS • OUTDOOR LIGHTING • LINE CONSTRUCTION MATERIALS • PORCELAIN INSULATORS • FIBRE PIPE & CONDUIT

L-M's POST TOP LUMINAIRES provide a low-cost means of converting old, inefficient lighting systems. A two man crew averaged less than 8 minutes per standard in converting this residential area.

L-M's Smart New Post Top Luminaires Make Attractive, Low-Cost Conversions

Line Material's new PTL offers the latest in design, appearance, and efficient illumination for the economical conversion of any post top lighting system.

The new L-M PTL (Post Top Luminaire) combines modern design with a highly efficient optical system, to provide the very latest in post top fixtures. With a minimum of cost you can adapt most existing standards to a charming modern installation with greatly increased lighting levels. Most standards can be modernized by direct replacement with a PTL at a cost comparable to the replacement parts for two old-fashioned ornamental glass globe and canopy combinations.

The PTL combines a rigid spun-aluminum reflector, an efficient Holophane® refractor, and a sturdy aluminum mounting base. The reflector swings open on a hinge for easy cleaning and for easy replacement of lamps and ballasts.

The combination of reflector and refractor directs all the light down to the surface of the ground. Light cannot shine up and be lost in the sky—no shades will be necessary to block unwanted light from adjacent areas. Lighting levels are automatically increased when PTL's are installed, without increasing lamp size.

Reflectors and base come in natural brushed aluminum or a choice of pastel colors. Available with photo control, to automatically turn light on at dusk and off at dawn. They will accommodate lamps up to 10,000 lumens, or 620 watts multiple; or with ballast in the fixture for mercury vapor lamps up to 250 watts. A choice of five IES light patterns is available; types I, II, III, II 4-way, and V.

You can install PTL's in streets, parks, or any other public areas where beauty and lighting need improving. Try a few in a test area. You'll be surprised at the difference they will make.

Get Complete Information

Be sure you get complete information on the ease and low cost of converting your present post top lighting to the modern efficient PTL. Contact an L-M Lighting Engineer or write direct to Line Material Industries, Milwaukee 1, Wisconsin. In Canada: CLM Industries, Division of McGraw-Edison Company (Canada) Ltd., Toronto 13, Canada.

REPLACEMENT is simple and fast in most instances. The old fixture is removed and the attractive PTL is mounted directly in its place with its own set screws.

LINE MATERIAL® Industries Outdoor Lighting

McGRAW-EDISON COMPANY

438

DISTRIBUTION TRANSFORMERS • RECLOSERS AND OIL SWITCHES • FUSE CUTOUTS AND FUSE LINKS • LIGHTNING ARRESTERS
POWER SWITCHING EQUIPMENT • PACKAGED SUBSTATIONS • CAPACITORS • REGULATORS • OUTDOOR LIGHTING
LINE CONSTRUCTION MATERIALS • PORCELAIN INSULATORS • FIBRE PIPE AND CONDUIT

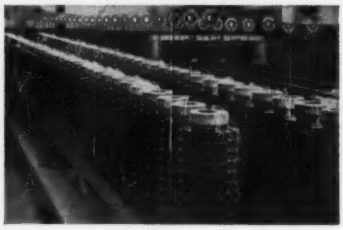
McGRAW EDISON

Exclusive Lapp Process Stabilizes Power Factor and Loss in Post Insulators

A LAPP LABORATORY REPORT

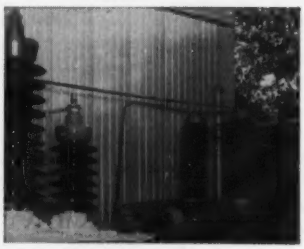
THE PROBLEM: Line Post and Station Post insulators occasionally have been found to show variation in power factor, charging current and watts loss under Doble tests. Field service seems not to have been impaired, but the phenomenon has been noticeable in such instances as erratic readings secured in tests of bushings connected to Post insulators.

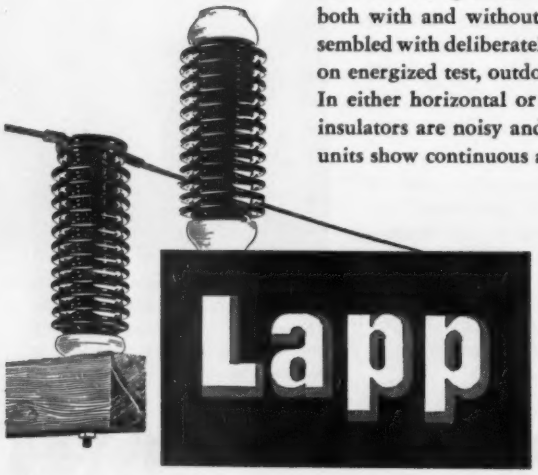
THE FINDING: Some years ago engineers of the Lapp Laboratory staff were assigned the job of tracing down the cause of such variations. It was located and identified as contamination deposits on the inside walls of the insulators. Porcelain bodies for Lapp Post insulators are subjected to a severe test for electrical soundness—a 3-minute flashover from the inside of the head around the body to the outside of the head. During this test the hole in the insulator fills with corona, and contaminating particles deposit on the walls of the hole; amount of this deposit and its effect on electrical characteristics vary with atmospheric conditions at the time of the test and at the time of plugging the hole for assembly.



THE SOLUTION: A thin coating of silicone applied to the wall of the insulator hole negates the effect of the corona contamination, and results in insulators dependably uniform in power factor, charging current and watts loss. Permanent effectiveness of the silicone coating is assured by its inherent chemical stability, and by the fact that the hole to which it is applied is sealed by the Lapp plug against weather, light, heat, or other physical or electrical attack. A Lapp patent is pending on the process.

THE VERIFICATION: All Lapp Line Post and Station Post insulator production for more than three years has incorporated the silicone treatment. The low initial power factor of the insulator has been maintained on every unit re-tested after service. In addition, in an effort to determine limits of effectiveness of the process, a series of insulators has been set up in the Lapp laboratory. Post insulators, both with and without the silicone treatment, were assembled with deliberately-defective plugs. They have been on energized test, outdoors, continuously for three years. In either horizontal or vertical mounting, all untreated insulators are noisy and show high loss. Silicone-treated units show continuous and unchanging low loss.



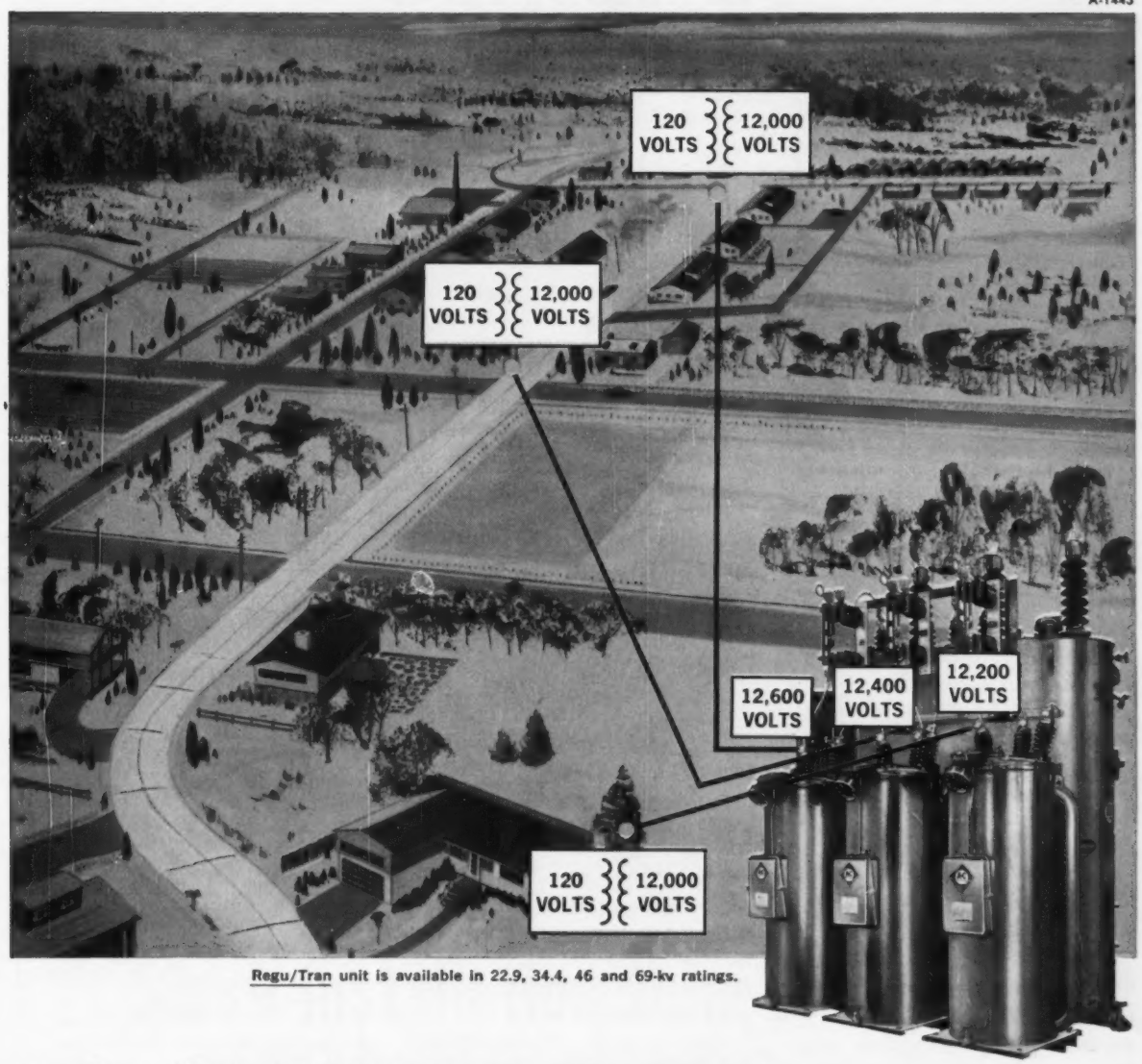


THE CONCLUSION: To the widely-known advantages, in electrical and physical performance, of its Post insulators, Lapp research has added the characteristic of stability in power factor, charging current and watts loss. *At Lapp, insulator design and production is a matter of continuous development and improvement.*

Lapp Insulator Co., Inc., Le Roy, N. Y.

ALLIS-CHALMERS

A-1443



Regu/Tran unit is available in 22.9, 34.4, 46 and 69-kv ratings.

New Regu/Tran unit with independent phase regulation

improves voltage control, increases revenue

Regu/Tran units are the economical answer to the problem of unbalanced loads and varying lengths of single-phase feeders. Three single-phase regulators with famous *Feather-Touch* control are super-sensitive and responsive to voltage changes. You get 1% control accuracy and 20% range of regulation. Advantage: increased revenue, better customer relations through improved voltage regulation!

- **SAFETY** — By-pass switches when required are fully visible. Permit de-energizing regulators and control without dropping service.
- **TAILORED REGULATION** — If just ±5% regulation is needed, that's all you purchase. No need to pay for unused voltage range.
- **VERSATILITY** — Use transformer and regulators as separate units.
- **MINIMUM INVESTMENT**— Buy Regu/Tran transformer first. Add regulators, by-pass switches as you need them.

Check these additional benefits of a Regu/Tran *unit.* **Allis-Chalmers,** *Power Equipment Division, Milwaukee 1, Wisconsin.*

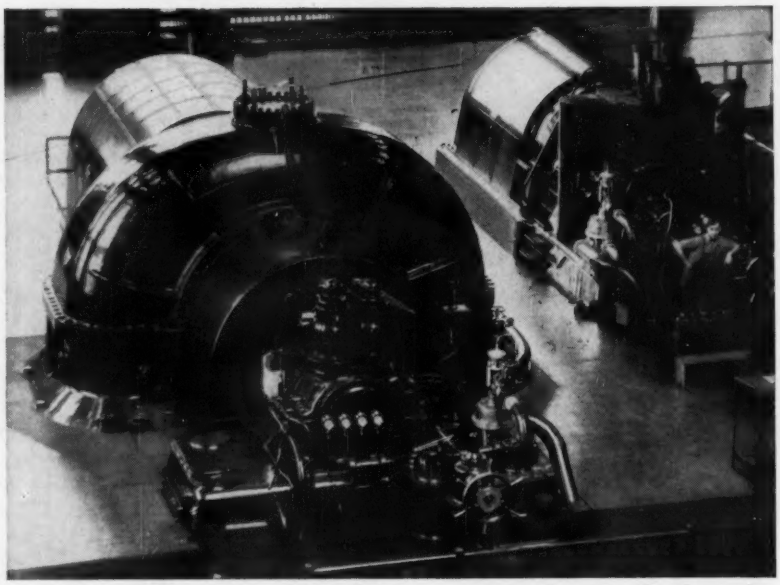
Regu/Tran and Feather-Touch are Allis-Chalmers trademarks.

TURBINES:

Shell reveals three ways that Turbo Oils help prevent oil breakdown, rust, sludge and foaming

Small quantities of air and water can work their way into any turbine lubrication system. These contaminants can accelerate oxidation of the oil.

Read how Shell scientists developed a specific formulation that counters this oxidation and brings you turbine lubricating oils with top performance records.



Shell Turbo Oils lubricate turbines with total rating of more than 17 million kw in the U. S. and Canada.

WHEN oxygen attacks turbine oil, it can form peroxides and organic acids. A chain of oxidation reactions begins. If the oil stability is inadequate, sludge can form.

Air entrained in the oil can aggravate oxidation. And it may cause foaming.

The oil may also be affected by water in the system. Laboratory tests have shown that water can greatly accelerate an oxidation process.

With Shell Turbo® Oil, Shell tackles these problems in three key ways:

1. *Shell carefully selects base oils for use as turbine lubricants,* then refines them to get the most effective response to Shell's special additives.

2. *Shell adds a powerful oxidation inhibitor to its precisely refined base oils.* This inhibitor helps prevent the chain of oxidation reactions caused by oxygen exposure at operating temperatures. It helps keep the oil in good condition, and lengthens its service life.

The result is that Shell Turbo Oils have proved themselves unusually stable over long service periods.

3. *Shell uses an outstanding rust inhibitor.* As a protective measure, Shell uses special additives that cover metallic surfaces with strongly adherent polar-type films.

These films are specially designed to help keep water from the metal surface.

In drastically accelerated laboratory tests, metals immersed in Shell Turbo Oils show outstanding anti-rust performance—even in the presence of sea water.

Ask your Shell Industrial Products Representative for facts on Shell Turbo Oils. Or write: Shell Oil Company, 50 West 50th Street, New York 20, New York.

Memo to utilities

Ten turbines in the U.S. have been running on Shell Turbo Oil 27 *since 1938.*

In Canada, Shell Turbo Oils lubricate turbines generating more than half of all steam power produced.

SHELL

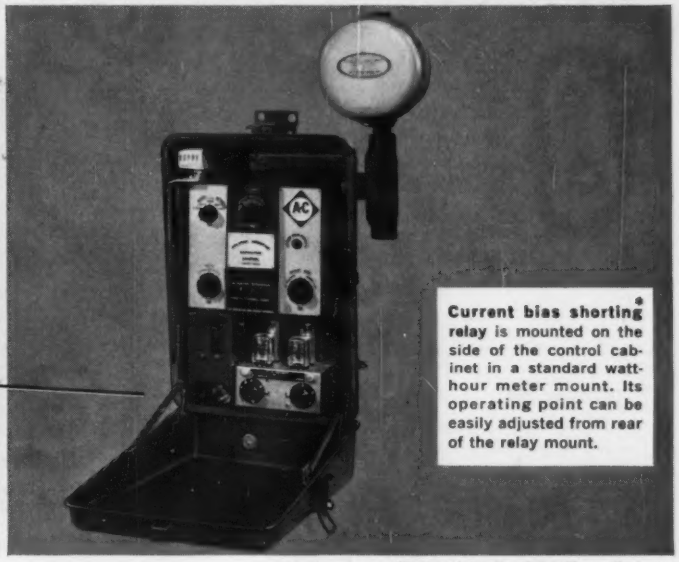
A BULLETIN FROM SHELL
—where 1,997 scientists are working to provide better products for industry

ALLIS-CHALMERS

Extended Foil Capacitors

A-1494

Pickup coil in insulator* provides a measure of line current. Installed without breaking the line, it supports the line in the same manner as other insulators.



Current bias shorting relay* is mounted on the side of the control cabinet in a standard watt-hour meter mount. Its operating point can be easily adjusted from rear of the relay mount.

*Designed by the Fisher-Pierce Company

Slash installation time over 50%

with new voltage-sensitive, current-bias capacitor control

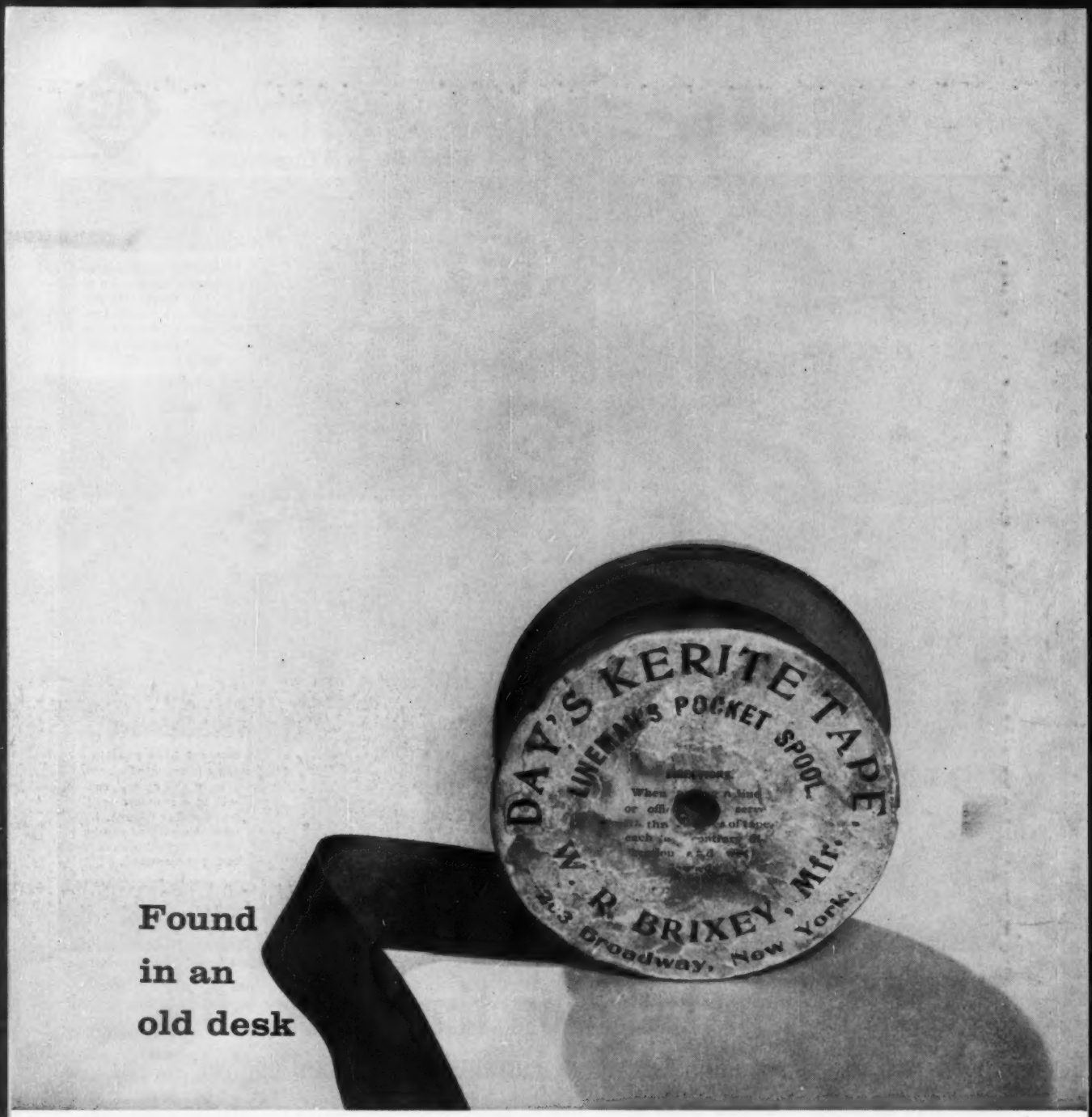
Employing an inductive pickup device rather than a current transformer as the signal source, the new Allis-Chalmers voltage-sensitive current-bias control can be installed *in less than half the time* required for existing controls.

By simply replacing the line insulator with the new pickup insulator, you can eliminate the time and effort of de-energizing, dead-ending and cutting into the line required for a conventional current transformer.

This new A-C capacitor control operates on either light or heavy system loads to switch capacitor banks for voltage correction and reactive kilovar supply.

For more facts on capacitor controls to maintain low-loss, high-power-factor system operation, contact your nearby A-C office. **Allis-Chalmers,** Power Equipment Division, Milwaukee 1, Wisconsin.

Allis-Chalmers extended foil design capacitors withstand higher inrush currents. Current densities are lower at point of contact between the packs and the contact plates than is possible with conventional tab-type capacitor construction.



Found in an old desk

When this spool of tape was new, the twentieth century had not yet been born. Salty old Captain Brixey owned the Kerite business and was making cable history.

His Kerite wire had been used for a 300-mile railway block-signal system . . . the longest aerial cable of its time. A Kerite 1,000,000 circular mil power cable laid in the Gowanus canal was already ten years old in 1908 and "just as good today as it ever was and giving the best possible service."

One of the Captain's most colorful projects was the Kerite cable laid along the Panama Canal, the first telegraph connection between North and South America. The joints were made with Kerite splicing compound (Kerite insulation in tape form). These joints were not only dielectrically sound but had to match the cable insulation in terms of insulation resistance and capacity in every way. Thirty miles of this cable were submerged, but in jungle and water, cable and tape stayed in service for over forty years.

A lot of time has gone by since this spool was young.

Yet this old tape is apparently as flexible and strong as on the day it was made.

The Kerite Co., 30 Church St., New York 7, N. Y. Agents in all principal cities. A member of the Railway Progress Institute.

KERITE

Premium grade insulated wire and cable . . . friction tape, splicing compound tape, rubber cement.

Space Heating—Whose Market Shall It Be?

Appearance in this issue of reports from two important and competitive meetings, though coincidental, serves as a forceful reminder of the electric utilities' stake in space heating.

The picture of an aggressive, coordinated organization dead-set on maintaining a lion's share of the space-heating market emerges from our report of the annual convention of the American Gas Assn (p 26).

The crying need for a closely organized and thoroughly coordinated program by electric utilities and manufacturers and their allies to combat the gas drive was among principal views expressed at *Electrical World's* fifth Electric Heating Conference (p 39).

AGA's Gas Industry Development Committee unveiled its long-term marketing goals, which it intends to attain by 1970 *or before*. By that time the gas industry plans to be installing 90% of all central heating plants and 50% of all central air conditioning plants. Undoubtedly as a by-product of these achievements, it expects by 1970 to supply 66⅔% of the ranges, 90% of the automatic water heaters, 20% of the refrigerators, and 60% of the clothes dryers. Then, as if to fling a final taunt at the electrical industry, the AGA committee says that it also hopes to add gas light installations equal to 25% of its residential customers.

Disclosure of these goals, and the generally aggressive spirit in evidence at the AGA convention, serves to emphasize the urgency and the pertinency of a suggestion put forward the week before at the Electric Heating Conference.

Speaking before some 300 utility, manufacturer, builder, contractor, and government representatives interested in electric heating, the Editor of *Electrical World* put forward a blunt suggestion:

> *I am recommending here and now the formation of a single national group to set policy, to coordinate, to sparkplug, to discipline if you will, the innovation, the national aspects of marketing, and the over-all promotion of electric heating. I conceive of a national organization representing and drawing from utilities, manufacturers, and heating and ventilating consulting engineers and other allies who are friendly to electricity.*
>
> *I am charging each of you with the responsibility for taking this idea home to your managements to see whether such an organization cannot be constructed. . . .*

While attendance at the AGA convention in Dallas left us with the impression that program "discipline" among the gas utilities is as voluntary as among electric utilities, we do sense a cohesion, perhaps born of need, that is absent in electric heating marketing efforts.

The over-all effect of the AGA convention was to reinforce our belief that the electrical industry must coordinate and solidify its research and marketing efforts or run the risk of losing out on the electric heating market, so pivotal to its load building requirements.

Udall Vague on Upper Colorado

Secretary indicates construction of some controversial marketing lines may still be open for negotiation

Interior Secretary Stewart Udall refused to say, in a recent Washington press conference, whether he is willing to negotiate for wheeling of federal power in place of building some of the controversial Upper Colorado Project lines between the three hydroelectric projects and major load centers.

"I think I can simply say at this time," said Udall, "and I would rather not discuss specific lines—in fact, I will not—but there are certain ones we consider backbone, and I don't think these are open to negotiation . . . I know this is rather muddy . . . but we will just have to leave it that way."

Udall clouded his answers on the Colorado lines for two reasons: **(1)** "The Bureau of Reclamation people are preparing some studies now which we will discuss shortly . . . I would expect within the next two or three weeks we may have some announcements to make on the basic decisions," and **(2)** "We started some conversations, negotiations, with some of the private power companies. I expect to reach agreement with them on some of the lines . . . We will make some decisions fairly soon."

Does Not Define Backbone

Udall also declined to be committed on what he terms the "backbone" system; but he did say, "We are on a state-by-state basis, however, ready for discussions with regard to some of the particular lines which are not, in our view, necessarily backbone lines; and by that 'lines' I mean lines which we feel must be built by the federal government in order to link up the federal system and protect its basic integrity with regard to our ability to transfer power back and forth the way we will need to in the system as a whole."

When asked whether the seven controversial marketing lines are part of the "backbone" system, Udall stated, "It is one of the things that has been in dispute. I would not say that all seven lines, that a final decision has been made, but I did want to make it plain in the statement I issued last week (EW, Oct. 2, p 62) that we are not just going to start round number three again, all over again, and have discussions of all of the lines."

One point Udall reiterated was that he wasn't thinking of any "package" proposal, either all-federal or all-private: "I always thought this was unfortunate—an 'either-or' proposition—and, actually, I think probably the best system from the standpoint of everyone concerned will involve a mixed system.

"We are not going to talk about any package proposition (with the companies), such as was presented to Congress," said Udall, "and this is . . . the point I was trying to get across—that I do consider that Congress made at least part of the decision for us." Udall here implies that Congress refuted a private package plan, but didn't close the door to separate negotiations. He continued, "We are merely opening up negotiations in some areas with some of the power companies involved, to discuss particular lines; not to discuss an over-all plan; and I am hopeful from the things that have emerged so far that we will be able to work out some arrangements with some of the private utility companies. I think we are going to find that the individual companies will be ready to discuss the specific proposals in their areas . . ."

Negotiations between the Bureau and Utah utilities were held last week in Utah, when Assistant Reclamation Commissioner N. B. Bennett Jr visited that state to discuss Colorado lines.

Little construction of the controversial lines, actually, will get underway this year. Work on most of the non-contested "integrating" lines between the hydro-power projects has been started, but little more than land surveys and some design work has taken place on the seven contested lines.

Here's a rundown on work started on the non-contested lines:

- Glen Canyon Dam to Shiprock, N. M. (Four Corners area): a contract was let in September to start building transmission towers for a 230-kv line—part of this to be open to manufacturers for installation of experimental towers and extra-high-voltage transmission facilities.
- Shiprock to Curecanti Dam, Colo., has been about 60% surveyed, and design work is under way on a 230-kv line. A construction contract probably will be awarded in February, 1962.
- Other lines already under construction for some time are Montrose-Gunnison, Colo., 115 kv; Craig-Oak Creek, Colo., 115 kv; Vernal, Utah-Rangely, Colo., 138 kv; Flaming Gorge Dam-Vernal, 115 kv. Incidentally, Moon Lake Electric Cooperative's 115-kv line from Vernal to Flaming Gorge (financed at double size by the Rural Electrification Administration to supply power to the Flaming Gorge construction camp) probably will be used by the Bureau to help bring power down to Vernal from Flaming Gorge—as Moon Lake had planned.

Status of Contested Lines

The contested lines are in these situations.

- The big, 345-kv line from Glen Canyon to Pinnacle Peak, Ariz., (Phoenix) is being surveyed now, and construction would be decided upon after Mar. 1, 1962, if its feasibility also is proved.
- The Shiprock-Albuquerque line, 230 kv, will be surveyed soon, but feasibility probably won't be settled before April.
- The Curecanti-Midway, Colo., line, 230 kv, won't be touched until next spring, because of high altitude and heavy snows. Surveys might begin in late spring.
- The Curecanti-Rangely, Colo., line, 230 kv, likewise will be put off until high mountain snows have melted.
- The 138-kv line from Springville, Utah, to Central Valley, Utah, also will be put off until spring, mainly because of its lower priority.
- Lowest priority has been assigned to the 138-kv lines up from Glen Canyon to St. George, Sigurd, Paragonah, Gunnison and Fillmore,

Utah. No survey or design of feasibility work will be started on these lines for some time.

Udall also mentioned these issues at the press conference:

Bonneville-California intertie—The Nov. 1 deadline, set for a final report by an Interior Department task force on the Bonneville-California intertie, probably won't be met, "due to some of the recent developments. Of course, as you know, Congress voted us additional money to make studies of greater depth. We were conducting the existing intertie study just by using our—some of our—best people, in the Department, on a part-time basis. The new money ($300,000) that Congress has given us will enable us to hire outside consultants to go into some of these problems in further depth."

Federal-private cooperation on common carriers—"I hope, before Congress returns, in time for consideration by the next (session of) Congress," said Udall, "our studies will have proceeded to the point, and our discussions with leaders of the private sector, that perhaps we can come up with some proposals for joint action to unusual advantage in the field of interties.

"We have federal power installations, largely on the rivers, largely hydro, and . . . of course, the great bulk of the industry is in the private sector, and it is largely thermal; but blending the two together, tying together the various regions, I am convinced—whether we accomplish it or not—I am convinced that it is in the interest of everyone to—in this particular area of interties—to get together and work out some agreements, and I am going to do the level best that I can, with my people, to see that we conduct a successful negotiation in this area."

Delaware Compact—Udall said he didn't feel the failure of Congress to include a public preference clause in the compact "was of particular significance, and probably the dispute will emerge at the time authorizing legislation is proposed in some public works bill."

"As I understand it," Udall added, "there are only two major structures on the Delaware—Tocks Island is one (Hawk Mountain the other)—which are large enough for significant quantities of hydroelectic power to be produced."

News Scope

TESTING — Cross-channel cable, connecting France with Great Britain, has undergone low power, short duration tests. Transferred power was fed into national networks. Date for putting cable into commercial use has been tentatively set for Dec. 8.

ATOMIC PARK—Pacific Gas & Electric Co has asked the California Commission for permission to build unit No. 1 at Bodega Bay Atomic Park. Principal components of the unit will be a 325-Mw turbine generator and a nuclear-fueled boiling water reactor. PG&E plans to begin work on the $61-million unit next year with an eye to operation by the end of 1965.

TWO GAS TURBINES—Delaware Power & Light Co plans to install two gas turbine generators at an estimated cost of $2,250,000. One, by General Electric Co, with an 11,700-kw capacity, will be installed next to the South Madison St substation. The other, a Pratt-Whitney with a 12,900-kw capacity, is set for Edge Moor Power Station and will use a jet engine identical to modern jet airplanes'. Both are scheduled for operation by Nov. 1, 1962, and will be used for relatively short peak demand periods. Push-button operated and remotely controlled, these units can be placed in operation in minutes. Installation of the units defers plans for a 150-Mw generator to be in Edge Moor. Major financing will not be required during 1962 and contemplated issuance of additional shares of common stock in spring 1962 will be deferred.

LATE FINISH—Once 16 months ahead of schedule, the $166-million Priest Rapids Dam has recently been completed slightly behind schedule. Delays were due largely to trouble with power plant equipment. Merritt-Chapman & Scott, which had seemed in line for a bonus of as much as $4 million for early completion, is now liable to a penalty. However, Grant County PUD, for whom the dam was built, indicated it probably would make no effort to collect.

SEEK PURCHASE—Duke Power Co has asked the North Carolina State Utilities Commission for authority to purchase distribution facilities and part of the generating facilities of Nantahala Power & Light Co. Duke would pay about $4 million for the facilities and also take over transmission and distribution in the Piedmont area now served by Nantahala. A subsidiary of Aluminum Co of America, Nantahala sells 60% of its output to Alcoa.

Bennett Rejects Application for Suit

Premier W. A. C. Bennett of British Columbia has rejected B. C. Power Corp's application for permission to sue the province for more compensation for the expropriation of its subsidiary, the B. C. Electric Co. While the company received no official decision from the provincial attorney general regarding the petition of right it filed Sept. 21, Premier Bennett left no doubt of what the government position would be.

"If this went to court shareholders might not know what they would get. The $38 a share (a reference to Bennett's payment made at the time of the seizure) would be frozen. There would be chaos everywhere," he said.

When British Columbia Power Corp filed its petition it sought a fiat from the government permitting the company to sue the crown for $225 million instead of $110 million that Bennett paid for B. C. Electric.

Protests from investment houses throughout the world have reached the British Columbia government. But Bennett has held firm, maintaining "When everyone realizes what the takeover involved and how this transaction came about, they will be one hundred percent behind us."

Gas Association Sets Goals

Annual AGA meeting used for all-out attempt to stimulate more intra-industry unity and new sales achievements

The American Gas Assn's board of directors has adopted long-range goals for a "united" gas industry to reach by 1970. Included are substantial shares of residential, commercial and industrial utility markets.

Formal acceptance of the master plan came during AGA's 43rd annual meeting in Dallas Oct. 1-4, a meeting that was filled with hoopla designed to spark a greater competitive spirit among rank-and-file delegates. The long-range program now goes to individual member firms for implementation.

A huge display of gas appliances and air conditioning equipment was shown at the new Dallas Trade Mart. Of particular interest were the gas turbines which provide the engine drives for gas air conditioning equipment. A model home at State Fair Park contained some 14 gas appliances including a gas toilet and an infrared gas heater.

The long-range plans were prepared by AGA's Gas Industry Development Committee, a group made up of top gas industry executives which was given the task early in 1960 of plotting the industry's future. Last April, the committee reported its recommendations for short-range "goals and aims." The long-range report approved in Dallas represents the committee's latest efforts.

Among the long-range goals to be reached before or by 1970 are such things as:

- A 34% increase over 1960 in residential customers for gas or LP gas, or a total 84% of American homes.
- A 60% increase over 1960 in the number of commercial customers. The report says gas should have 4,640,000 commercial customers by 1970.
- A 50% increase—to 260,000—in the number of industrial gas customers.

In order that such goals might be reached, the GID committee recommended a number of marketing, research and other goals.

In marketing, it said the industry should achieve by 1970 "or before" 66⅔% of all ranges sold; 90% of total automatic water heaters sold; 20% of total refrigerators sold; 60% of total clothes dryers sold; 90% of total central heating plants sold; 50% of total air conditioning central plants sold; and should have gas light installations in number equal to 25% of the industry's residential customers.

The committee also said "favorable conditions" should be brought about in gas-served localities "making practicable the use of gas incinerators as a superior method of garbage or waste disposal."

In research, the goals are for such things as a "new approach to gas cooking," and "smaller, longer-life water heaters." One part of the research goal says simply, "improved appliances to meet and beat competition."

GID also wants a prototype gas-powered thermoelectric or thermionic small residential air conditioner by 1970.

The long-range program calls for a number of other things, mainly having to do with improving and reducing gas distribution costs, and in improving both public and intra-industry relations.

The report admitted to a number of fundamental weaknesses in the present gas industry, and said they must be strengthened if the blue-sky marketing and other goals are to be reached.

For instance, it said the gas appliance manufacturing branch should accept by 1970 the "primary responsibility" for developing, promoting and selling appliances. At the same time, however, it said utility members should not withdraw its present support from this area.

The GID committee also admonished utilities about their lagging appliance merchandising programs. It urged greater effort on the part of utilities in building up larger

GAS ASSOCIATION LEADERS, from left, are W. G. Hamilton Jr, president of Gas Appliance Mfrs Assn; E. H. Smoker, new AGA president; Chet Stackpole, AGA managing director, and L. T. Potter, outgoing AGA president

for Accelerated Sales Drive

volume in gas appliance sales.

These long-range recommendations are being sent out to top executives of member gas firms. Progress toward the goals will depend on how well they are accepted by individual firms, and how much zeal each firm puts into trying to achieve them.

AGA's top leaders claim the gas industry now has the "cooperative spirit" and zeal necessary to reach the goals.

L. T. Potter, president of Lone Star Gas and out-going AGA president, said he found an "awakening spirit" throughout his industry. He said this spirit has just recently come into evidence, and compared the "new spirit" to a "staid" one of the past. Potter said gas has been spurred to combat by "the very aggressive electric utilities."

Research Is Important

E. H. Smoker, president of United Gas Improvement, Philadelphia, and AGA's in-coming president, backed up Potter's talk of "new spirit" by discussing the added importance the industry is now putting on research to reach its goals.

AGA has an industry-wide research program of its own, to which member firms contribute. This year, Smoker said, the association will spend $3 million on its research program. He hopes to see this budget hiked to $6 million by 1965, and by then, he hopes the gas appliance and equipment branch will be spending at least another $7 million on research.

Smoker said some of the short-range AGA research goals, with a target date of 1965, include such things as a regenerative gas fueled turbine for use in industrial air conditioning system; an air-cooled engine compressor system for residential air conditioning; improved commercial kitchen equipment; and improved flexible connectors and quick disconnects to make portable plug-in appliances possible.

Also by 1965, Smoker said, AGA hopes to have made "considerable progress" in the area of thermoelectrics, thermionics and fuel cells. He added one of AGA's projects is aimed at developing a prototype thermionic 300-w generator.

William G. Hamilton Jr, president of the Gas Appliance Manufacturers Assn, said the gas appliance industry expects to ship 50.7 million units of home equipment in the next five years. Among the products in best demand at present, Hamilton said, are built-in gas ranges, gas boilers for central heating and gas air conditioning.

Such ebullient statements as those of Potter, Smoker and Hamilton set the tone for the AGA convention, which filled most of Dallas's hotels with some 3,000 delegates and guests. Convention planners obviously worked hard to fill the delegates with that "spirit" the leaders spoke of.

Why the attempt for such a gaudy convention? One of the convention planners put it this way:

"Let's face it. Most of our people have never had to really get out and hustle new business. They are dead and need to be fired up. That's what we are trying to do here. I don't know what it takes to stimulate them, but we don't want to miss any possibility."

To show they intend to keep the "new spirit" alive on down the road, AGA previewed for the delegates some details of future promotion and advertising plans.

The association will fully sponsor one-hour special color dramatic shows once a month from October through April on NBC-TV. These shows, to be called "Theater '62," will all be live except one. No mention was made of the cost, but an NBC spokesman said at the meeting the network is spending $250,000 promoting the series.

Commercials for the monthly shows are designed so local utility firms can tie their own promotion programs into them.

The delegates were also told that the industry has now raised $3.25 million for a projected 4.5-million exhibit at New York's World Fair in 1964. John E. Heyke, president of Gas, Inc, told delegates "when this fair is over, 70 million people will have received our pitch."

The problem of federal and state regulation is still a problem for the industry, Potter told the delegates in his address, but he said great improvement has been made in the application of federal regulations. This, he said, has come about primarily as a result of AGA's "Special Committee of Executives on Regulatory Affairs." Potter pointed out that three suggestions made by the SCERA group have been instituted by the Federal Power Commission, and others have been "accorded favorable attention."

Potter also said there is more unity now among the gas industry's three segments of producer, transporter and distributor, although he and others admitted there is still much work to be done in this area. In fact, W. M. Elmer, president of Texas Gas Transmission Corp, blamed intra-industry squabbles for declining investments in gas stocks. Elmer added that the drop-off in investor interest is affecting some gas transmission construction programs.

One of the industry's long-range goals, Potter pointed out, is to bring about a more united front among all three segments. He believes this can be done, and that it will greatly enhance the industry's image from both Congressional and public points of view.

Swidler Comments Against 1,000-Mw Station Location

Commenting on the Consolidated Edison announcement that it will build a 1,000-Mw generating station, Federal Power Commission Chairman Joseph Swidler said he was delighted to see the industry going to larger and more efficient generating units and hopes industry executives will continue to take advantage of opportunities afforded by advances in technology and stronger interconnections and pooling.

However, Swidler said he doubted that the installation of a unit of this size on Manhattan Island represents sound national policy or is in the interest of the city of New York.

Con Ed's only comment was, "This is where we need it."

The FPC does not have jurisdiction over thermal generating plants under the Federal Power Act.

GERMAN BEAUTY Marlene Schmidt talks to Lank Felsen (center) and Bruno Zambotti, and looks at "Electrical World"

Miss Universe Charms Fellow Engineers

A refreshing departure from routine was enjoyed recently by *Electrical World* Editors Bruno Zambotti, Lank Felsen, and Dale Van Horn, who managed to get to interview Miss Universe, Marlene Schmidt, who is an engineer in West Germany.

The beautiful Fraeulein, who is 24 years old, is employed by the J. C. Eckardt Co of Stuttgart, a manufacturer of control components. She is the only female on the company's 30-member engineering staff, works 45 hours a week, and is paid the equivalent of $54 a week.

In the course of the interview, Miss Schmidt diagrammed the firm's boiler control system, enthusiastically leafed through a copy of *Electrical World*, and managed to display considerably more poise than her interviewers. She commented that interest in generating station automation is not as high in Germany as in the United States.

Although the interview was not particularly technically enlightening, this mattered little to the interviewers. The conversation was conducted in German and was understood only by Felsen and Miss Schmidt, but again, this had very little importance to the other two editors. A person endowed with Miss Schmidt's beauty doesn't have to say anything to be interesting—or be an engineer either.

An interested observer of the interview (quite by accident) was W. D. Virtue, executive vice president of Public Service Co of Colorado, who happened to be having lunch in the same dining room in New York's Plaza Hotel.

'Shared Responsibility' Keynotes EEI Talks

"Instead of fixed responsibility, there should be shared responsibility," asserted one of the keynote speakers at the recent roundtable conference of the Edison Electric Institute Industrial Relations Committee in Chicago. With individual variation, this was the broad answer submitted to each of the four major questions raised at the conference.

The more than 300 utility industrial relations specialists attending the conference sought to place the responsibility in four areas of personnel development. The areas: middle management development, cost of manpower, leadership by first-line supervisors, and self-security. Each time the answer came back: "shared responsibility"—either between the man and his company, or the man and his superiors, or between staff and line.

In its unusual conference format, the EEI committee first listened to keynote speakers in each of the problem areas, then divided into small roundtable groups for an intensive exchange of experience and opinion. The keynote speakers pointed to possible answers, but left it to the roundtables to arrive at more conclusive responses.

It was Keynoter R. H. Sessions, personnel director of Idaho Power Co, who supplied the apt expression, "Instead of fixed responsibility, there should be shared responsibility." He urged the industrial relations men to take the initiative in planning and administering programs for development of middle management personnel, but indicated that department heads and candidates also have vital roles to play in such a program.

Said Sessions, "Basically, I feel that if there is going to be a survival of our business and industry as we know it today, there must be a new approach and greater importance attached to the human relations training that candidates for management are exposed to.

"The selectors who choose these men to be so trained must be upgraded in their thinking and understanding of what it takes to be a leader in the automated business of the future. Of equal importance

there must be an upsurge in understanding of the part that the study of human behavior can play in avoiding costly mistakes in management development."

Seeking to place the responsibility for controlling the cost of manpower, F. L. Larkin, Wisconsin Electric Power Co vice president, agreed that both employees and officers must share in this responsibility. Declared Larkin, "Neither the line organizations nor the staff departments can achieve maximum effectiveness without the other. If there were a means of weighing responsibility (for manpower costs) in terms of pounds and ounces, I believe that the scale would tip downward on the staff specialist side."

Frank M. Osta, Niagara Mohawk Power Corp vice president, also hit upon the shared responsibility theme in discussing the development of leadership qualities in first-line supervisors. In this case, it is both top management and department heads who must back up the supervisor. "No matter how anxious a person may be to exercise his leadership abilities and do an effective job as a first-line supervisor, for which he is eminently and admittedly qualified," said Osta, "he will be unable to turn in an effective performance unless the organization of which he is a part provides the atmosphere, climate, conditions and inducements that are necessary in achieving such a result."

Even in the area of self-security for the individual, the responsibility is shared. In his keynote talk, A. L. Clark, personnel manager of Virginia Electric & Power Co, concluded:

"We have **committed** ourselves voluntarily by management prerogative, conveniently by union agreements, and have been committed involuntarily by governmental edict to the assumption of a large measure of the individual's financial security through our welfare programs and others. If we once assume full responsibility for his financial welfare, is there any way of avoiding ultimate assumption of full moral obligation for the self-security not only of the individual, but also of his family? There is no trend—we are committed. It is just a matter of degree. Our commitments are from here to hereafter and beyond."

Florida Judge Rules Against Co-op in Territorial Case

A Florida Circuit Court Judge has issued a final decree permanently enjoining Withlacoochee River Electric Cooperative from serving two Pasco County customers previously served by Tampa Electric Co.

In so doing, the judge also delivered a ranging opinion on the changing role of co-ops in American society.

Judge Charles Phillips, of the Sixth Judicial Circuit Court, issued his decree after two days of hearings in Dade City, following the remanding of the case for further proceedings in line with the state supreme court decision. The case has seen three years' litigation in Florida courts.

The Judge pointed out that, according to the Florida Supreme Court philosophy regarding co-ops, Tampa Electric had the "pre-emptive right" to serve customers in areas where lines of the investor-owned utility were adjacent to those of the co-op.

Florida Statutes Violated

It was shown that Withlacoochee had violated the Florida statute which prevents co-ops from serving customers receiving adequate central station service. Judge Phillips stated that Tampa Electric service had been available "not remotely but immediately adjacent to the place to be served."

The Judge's opinion then ranged about the nature of co-ops' operation as defined by Florida statute:

"The rural electrification program was a stop-gap, a crash program . . . and that as a part of that program, there is a conscious and planned program of anticipated attrition. In other words, as an area becomes more urbanized, as certainly this area is, it is within the scope of that philisophy that eventually there would be no rural electric cooperative . . ."

Judge Phillips asserted that the rural electric cooperatives were begun in order to serve economic and social purposes of government. But that ". . . does not, so long as that creation is for a specific purpose, necessarily mean that some program that has been created must always exist."

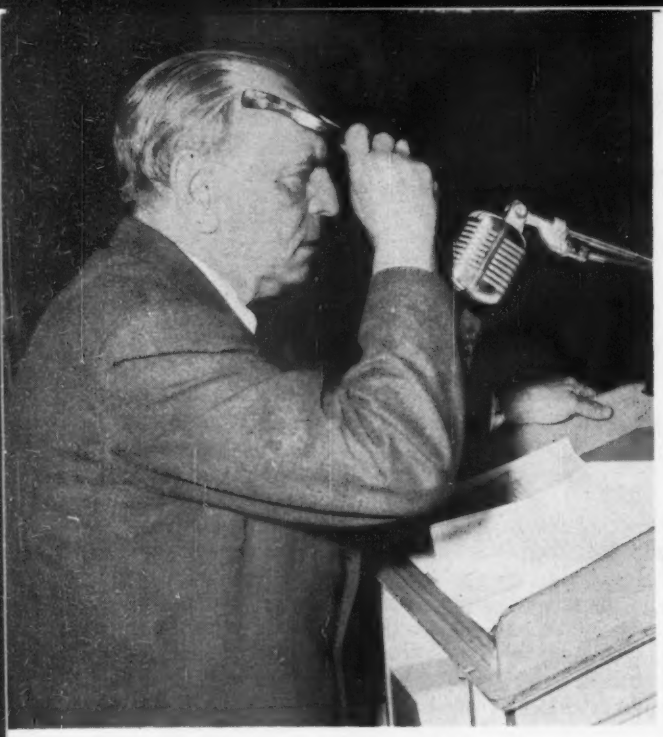
He declared that after such co-ops have fulfilled their social and governmental obligations, they should be required to operate as private industry or under the same regulations. "It may well be," Judge Phillips said, "that in the future these rural electric cooperatives will be converted to regular private industries on an equal basis with other private industry. Certainly if the philosophy is to give private industry the pre-emption, as it appears to be from our Florida statutes, then these facilities may at some time in the future be acquired by private industry."

During the hearing, Judge Phillips said that "different conclusions" from that reached by the Florida courts might result if this case were tried in federal courts. But, he declared, he was of the opinion that "the initial sovereignty rests in the state of Florida and that the federal government has only delegated sovereignty." The federal government exercises control over portions of the rural electrification organization, such as financing and criteria for financing, Judge Phillips said. But Florida also has statutes that govern such organizations.

In reply to a question as to what the situation would be if a co-op were adjacent to an area and Tampa Electric moved in and established lines that were "available and adjacent," the Judge replied:

"It depends on whether the Tampa Electric Co line, before the extension to reach that customer, was available within a reasonable interpretation of the word 'available.' If it were a hundred feet from being adjacent, I think Tampa Electric should have the customer. If it were a mile away from the property on the east and the co-op was adjacent on the west, I think the co-op should serve."

However, he urged the investor-owned and co-op utilities not to extend their lines "in any awkward or unbalanced fashion to try to preempt customers."



Landis, Mitchell Plug for Regulation 'In Step with Times'

Speakers tell National Assn of Railroad & Utilities Commissioners streamlining of agencies is basic to free enterprise

JAMES LANDIS concedes nation's economy is hampered by excessive regulation; proposes more freedom to plan growth

RICHARD McMAHON, Maine PUC, heads panel on Determination of Cost of Equity of a Utility. Participants (seated) were: Charles Tatham, David A. Kosh, Freyman Coleman

An active role in the streamlining of major federal regulatory agencies was urged on the National Association of Railroad & Utilities Commissioners at its recent Atlantic City, N. J., convention.

The efficiency and integrity of regulatory commissions' operations are basic to the economic development of the country under a system of private enterprise, declared Peter E. Mitchell, NARUC president, in bluntly urging state commissions to support and lend prestige to this effort. The same need was cited by James M. Landis, former assistant to President Kennedy.

"If the important problem of keeping regulatory agencies in step with the times and with the technological advances in the industries

NARUC Committee on Nuclear Energy is studying these questions:

1. Do hearings on requests for certificates of public convenience and necessity for plant construction concern themselves with the economics of the proposed plant or are they largely limited to determining the need for and amount of plant capacity to be added?

2. For rate-making purposes, how are research and development costs treated when:
   a. contributed by one utility to another utility?
   b. incurred in connection with a nuclear plant to be owned by the utility paying the research and development costs?

3. Excluding pre-construction research and development costs, how are plant and equipment costs in excess of the costs for a conventional plant of the same capacity handled? Will the treatment depend on whether the fuel and operating costs of the nuclear plant are greater or less than those of a comparable conventional plant? How are such differences in construction and operating costs handled comparing fossil fuel and hydroelectric plants? Does the possibility that a nuclear plant may have a higher average plant factor over its life justify somewhat higher capital costs?

4. Some day, private ownership of special nuclear material may be permitted. Would utilities finance the large investment required for nuclear fuel inventories in the same manner as they finance plant and equipment? How would the investment in fuel inventories be treated in establishing the rate base and would the method of financing the nuclear fuel inventory affect the rate of return allowed?

5. Will the added insurance costs for a nuclear plant be allowed as a regular operating expense?

6. If it will be necessary for nuclear plants to be located somewhat farther from load centers than conventional plants, how will the added investment and operating costs connected with the longer transmission lines be handled?

7. Probable useful life of nuclear energy plants for purpose of depreciation.

regulated and free of undue influences is to be resolved without a manifestation of interest by this association," said Mitchell, "the least that can be said of us is that we are wantonly aloof and completely detached from reality."

As pressures on the government to do something with the federal regulatory system seem likely to continue, the NARUC cannot remain silent while major changes in regulatory laws and procedures are debated, he declared.

In supporting Mitchell's demand for NARUC participation, Landis noted that many weaknesses of the US economic system derive from over-regulation, the insistence of government on hemming in the capacity of private enterprise in the choice of its own ways to survive and grow.

Low earnings on equity capital does not necessarily mean low rates for utility service nor high earnings, high rates, said Freyman Coleman, California Public Utilities Commission. Regulation, he said, aims primarily at assuring "the best service to the ratepayer at fair and reasonable rates."

For such service, the basis, he said, is common stock equity. When this solid base enjoys earnings that compare favorably with earnings in industry, senior capital is more obtainable on favorable terms, and the consumer benefits.

The flow of new equity money into the business, Coleman continued, enables a utility to meet the increasing demands for additional and improved service and to provide for the increased efficiency of its own plant, thus lowering operating costs—again in the interest of the consumer.

Most commissions regulate on the basis of original cost or net investment, said David A. Kosh, utility rate consultant. He noted his own puzzlement at electric utility stocks selling at a price more than twice their book value.

What the commissions, he went on, are, in effect, saying is this: The book value of the utility is the earning base, but the book value of the common stock is the amount on which utilities are entitled to earn a fair return.

The rates prescribed, he said, are presumably designed to provide the return which capital markets require to offer needed capital on reasonable terms.

The difference between what the commissions call earnings value and what the capital markets say it is shows up when the latter say: "We think the value of the equity is not what you regulators started with, but twice that amount."

In fair-value states, there is a substantial spread, said Kosh, between market price and book value, as the latter understates the rate base value.

"We expect to see market prices in excess of book value, so that additional stock can be sold without diluting the earnings' position of investors," he continued. "And there are other reasons for this spread. The question is: How much? But because of some of the spreads today, I suggest that a review of the situation is worthwhile. I do not say industry-wide rate reductions are called for. I do say a review is."

When an investor pays high price for a stock in relation to its current earnings, he feels reasonably sure earnings will increase enough to provide at least a 50-50 chance that eventually they will support an even higher value, said Charles Tatham, Bach & Co.

When, a few years ago, electric utility stocks sold at about 14 times current earnings, he continued, investors were not willing to pay for more than ten years' growth. But today, they are confident that the industry will continue to grow, and the current level of market prices forecasts growth for at least 20 years.

Both Kosh and Tatham were of

(*Continued on page* 88)

Soviet Program Boosts Power Goals

US electric utility authority evaluates motivation, soundness, and chances of realization of Soviet Party's electric power goal of 2,700-3,000 billion kwhr by 1980

PHILIP SPORN, President, American Electric Power Co, New York, N. Y.

Once again the Soviet Communist Party has raised its electric power goals for 1970 and 1980. Its new power aims are laid down[1] in the draft program for the Party which established guidelines of policy, and set new economic goals for the next 20 years. They will be presented to the Party's Twenty-second Congress this month.

This latest upward revision of Soviet electric power aims contrasts sharply with earlier projections. Consequently it is worth analysis and testing on two counts:

1. What may be behind the change

2. Its soundness and likelihood of realization.

A summary of the present and previously published Soviet electric power goals through 1980, reported in official documents is shown in Table I.

The most interesting figure here is the 1970-1980 projections of the draft program. The 1970 figure remains essentially unchanged except that an upper figure of 1,000 billion kwhr has been added to provide a 100-billion-kwhr range of estimate in place of the earlier single figure. The 1975 projection is omitted.

But the program for 1980 has been increased very sharply from 2,300 billion to 2,700-3,000 billion kwhr. Whichever base is taken for 1970, whether 900 billion or 1,000 billion, the program calls for trebling energy generation between 1970 and 1980. This is a compound rate of annual growth of 11% in the decade.

In spite of past experience with Russian achievement in attaining projected aims singled out for special attention, one cannot help having serious reservations regarding the Soviet Union's capability to achieve these new electric power goals.

It's quite clear that with this new Communist Party draft program Khrushchev is attempting to stress and hammer home, both among his own people and among the uncommitted peoples of the world, the old theme that capitalism is in crisis and decay, and therefore the triumph of communism is certain everywhere in the world.

Because electric energy has been given a prominent symbolic position by the Russians and because it is a very important indicator of technological and economic progress, it is especially important to examine these new electric energy projections.

What then is the motivation behind these new 1970-1980 energy projections? In a previous article[2] we pointed out that the increase in energy production between 1958 and 1959 was 10.9% and that this rate was actually a decline from previous rate of growth of electric energy output. It is even more interesting that the previous 1975-1980 projection shows an increase from 1,500 to 2,300 billion kwhr. This represents a compound annual growth rate slightly under 9%. Now the new draft program shows a 1980 output of 3,000 billion kwhr or an increase of 30% over previous announced goals and a compound annual rate of growth of 15%.

Since the aim of the Communist Party draft program is to assert the superiority of Soviet communism over Western capitalism and since it sets forth as an article of faith that the Russian economy will surpass that of the US by 1980, it

[1] New York Times, July 31, 1961, and August 1, 1961

[2] "Soviet Shift to Big High Pressure Steam Units Shows No Surprises," Philip Sporn, EW, May 29, 1961

Table I—Russian Power Program for 1958-60 and for 20 Years Beyond 1960

(Billions of Kwhr)

Source	Kwhr Generated 1958	1959	1960	Projected Generation Program 1970	1975	1980
Electrical World, 4/8/60	233.0	248.0*	274.5**	.....	.....	.....
Khrushchev speech[1], 11/28/59	.....	.....	.....	900	1,500	2,300
Electrical World, 5/29/61	238.0	248.0*	274.5**	900	1,500	2,300
Draft Program Communist Party, New York Times, 8/1/61	.....	.....	.....	900–1,000	.....	2,700–3,000
U. S. Production, Electrical World, 5/29/61	725	795	840	1,750	2,375	3,200

[1] Before All Union Conference on Power Plant Construction.
* Corrected for net.
** From Quarterly Bulletin of Electric Energy Statistics, published by United Nations.

to Improbable Heights

would hardly do to show figures below the US for that year. Most projections of electric energy production in the US for 1980 have been around 3,000 billion kwhr. Thus it would appear that this figure was chosen because of its relation to US projections rather than on the basis of any carefully conceived program.

Can Russia Meet Its Goal

Be that as it may—What about the soundness of the projection and its likely realization? Here it is necessary to point out again what has been pointed out previously[2]. *Construction of electric generating capacity by itself does not guarantee electric power production.* The determining element in electric energy generation is the existence of utilization and the rate at which it is employed. When such utilization equipment is absent, generation simply does not take place. Russian authorities, notably M. Vilenskiy, have clearly recognized this.

On the AEP system, for example, we are now projecting an annual average consumption of between 10,000 and 11,500 kwhr per residential consumer for the period 1975-1978, compared with a current level of about 4,400 kwhr. It is obvious, however, that no such consumption can possibly take place without a very high degree of electrification in the home, and a substantial number of all electric homes.

Thus, the high level of electric utilization projected by the Soviets cannot come about unless their economy is capable of three essential prerequisites:

1. Building the necessary electric generating capacity

2. Producing the necessary utilization devices

3. Providing the levels of consumer income necessary to make possible the purchase, installation and use of that equipment.

At the present time the Russian economy has developed electrification in the home to the point where the average annual residential consumption is of the order of 500 kwhr. . . about one-eighth the US average. It is inconceivable that the Russian economy will be able, in the short period of five decades, to bring about such a radical transformation in the welfare of its people to increase the average eight-fold. This is particularly true when it is realized that in this same period investment in electrification of industrial, commercial and rural activities must be maintained at an extremely high level if the new 1980 goal is to be reached.

Within the time limit of these projections, electric energy growth is likely to be determined primarily by the rate of over-all economic growth, by the rate at which utilization devices are made available among the civilian—including agricultural—population and by the rate at which industry is electrified.

The industrial, commercial, and rural use of electric energy, as in the case of residential use, cannot grow without the availability of utilization devices. It may be that at the present time the limiting factor in Russia's use of electric energy is the absence of generation and transmission facilities but this is likely to be overcome more easily and quickly than the inadequate availability of energy consuming devices.

Be that as it may, if it is assumed that the draft program has been projected to impossible heights, what, then, can be reasonably expected? A proper or sensitive appraisal may have some value. On that basis Table II is presented as a non-scientific, but nevertheless informed, empirical appraisal of the optimum that may be expected of the Russian power system in the next two decades.

The starting point for this is the 1960 Russian figure of net production of 274.5 billion kwhr. The US figures are net. For comparison purposes, therefore, it is proper to subject the Russian gross figure to this correction.

It is interesting that even this lower projection will require the annual addition of some 22 million kw of capacity as an average for the five years, 1976-1980. As contrasted with the above figures, the capacity additions between 1958 and 1959 were 5.5 million kw and the projected seven-year program terminating in 1965 calls for an annual average addition of between 8.3 million and 8.5 million kw of capacity. It is also worth noting that according to the report of the USSR Council of Minister's Central Statistical Administration electric power output in the first half of 1961 was only 9% above that of the same period in 1960.

It may be that the projection visualized in the draft program will actually be attained, but certainly present sober judgment would indicate that the probabilities of its not being realized beyond about the limits of Table II are much greater than the probability in favor of realization.

Nevertheless, attainment of even these more modest—but surely more realistic—figures by 1980 would represent a substantial achievement which will not be easily realized.

Table II—Probable Increase in Russian Electric Energy Production, 1960-1980

Period	Compound Rate of Increase During Period Shown	Total Increase in Percent Within That Period	Kwhr Produced in Last Year of That Period in Billions
Year 1960.....	.....	..	275
1961–1965.....	10.0%	61	443
1966–1970.....	9.5%	58	700
1971–1975.....	9.0%	54	1,078
1976–1980.....	8.5%	50	1,617

Foundations Designed for Quick

More economic for Florida Key co-op than structures withstanding 200-mph wind; Hurricane Donna hit system hard

Foundations so designed that damaged distribution-line structures can be replaced on them quickly were developed for Florida Keys Electric Cooperative Association as a consequence of the effects of Hurricane Donna. As structures withstanding a 200-mph wind velocity were not feasible economically, the co-op pitched on the foundations as the alternative.

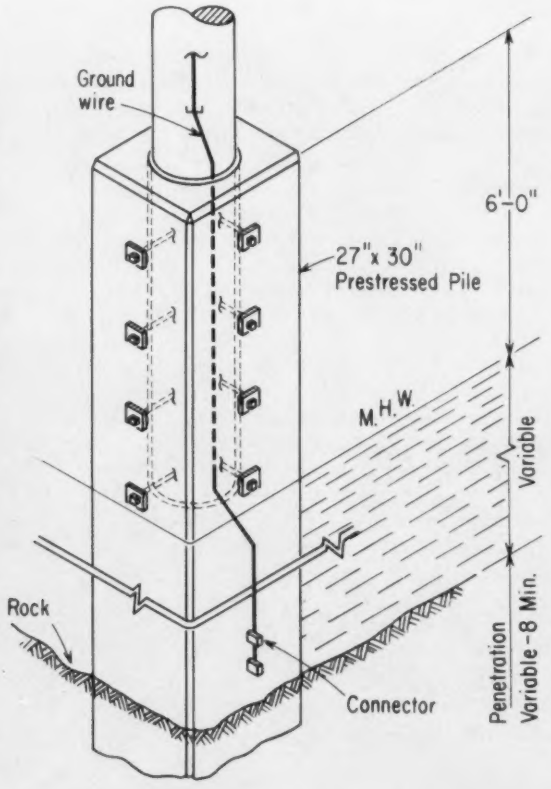
The design was developed by the consulting firm, E. P. McLean Engineering Co, Moultrie, Ga., for structures in lines across open water. The Florida Keys system extends across the keys at the southern tip of the state. During the worst of the 1960 hurricanes, structures in the open water were either totally lost or severely damaged by winds officially recorded at 168 mph, with gusts exceeding 200 mph.

The design calls for a prestressed concrete piling 27 x 30 in. driven 8 to 10 ft into rock. A hole in the top receives the largest creosoted pole. The piles are precast with smaller holes for securing the pole in place vertically with bolts of silicon bronze. A "weep" hole at the bottom is the outlet for water deposited by rain or waves. This "weep" hole also has this purpose: Through it, a ground wire extends from the pole and down the side of the piling to a ground connection below the water line.

The co-op's plans call for a 69-kv H-frame line connecting the lower with the upper end of the system. For this line, the strength requirements of the pilings were calculated for wind loads of 200 mph on the H-frame, a creosoted-pole transmission structure with two sets of X-braces. Such structures will carry two No. 2, 3-strand copper static conductors; three No. 4/0, 7-strand copper phase conductors for transmission; and, three 1/0, 7-strand copper conductors for the distribution circuit. Ruling span will be 300 ft.

Design moments for a 200-mph wind loading on these structures are: 87,629 ft lb at the top of the pile, and 444,005 ft lb at the rock line. The poles will be 50 ft Class 1. Maximum stress on the piling will be at the rock line, and maximum downward force on the leeward piling due to a 200-mph wind will be 33,861 lb.

FLORIDA KEYS off the southern tip of state are served by an electric system traversing wide and exposed channels



PRESTRESSED CONCRETE PILE was designed to withstand hurricane winds, offers permanent foundation for rebuilding

Rebuilding

As the water pressure to which the piling could be subjected during a hurricane was not known, maximum tide velocities were measured at the channels where lines were to be sited. The maximum measured was 3.6 ft per sec. Design allows for five times this velocity, 18 ft per sec. Water pressure on the piling will be almost 16,000 lb at this velocity.

Juno Prestressors, Inc, West Palm Beach, Fla., cooperated with McLean in developing the piling design. Calculations indicate that the piling will withstand the moment of 444,000 ft-lb at the rock line. Design safety factor is two.

The strength of the piling, as shown by Juno's tests, indicate that it could withstand a moment of 1,297,766 ft-lb with a safety factor of 2.92 in a wind velocity of 200 mph. Such piling will enable the co-op to repair and replace lines across open water at a reasonable cost. Only ordinary barges will be required.

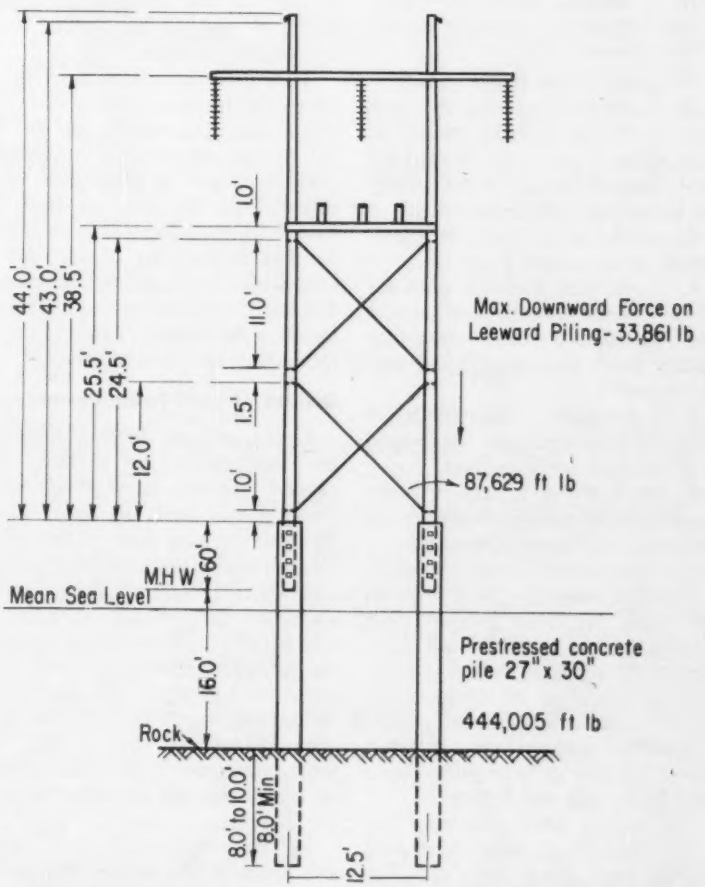
During recent installation, a steel caisson was sited precisely down to bed rock where the piling was needed. A heavy steel punch, dropped inside the caisson, broke up the rock. The caisson was driven deeper as the rock hole was punched. High-pressure pumps removed foreign material. Then the piling was driven in the hole.

Initial lines on the new foundations were single-pole distribution lines operating at 14.4/24.9 kv. Its poles were 35-ft Class 1, and the ruling span was 300 ft. Each of the three phase conductors was No. 1/0, 7-strand, hard-drawn copper, and the neutral a No. 2, 3-strand hard-drawn copper conductor.

These lines were designed for a wind loading of 194 mph and for calculated maximum bending moments of 124,200 ft lb at the top of the piling and 430,213 ft lb at the rock line.

Damage to the Florida Keys system by Hurricane Donna cost the co-op about $1 million, according to J. H. Phillips, manager, who noted that this experience taught one lesson: That a small electric system needs to "maintain a strong cash reserve position."

CONCRETE PILES are driven and set by equipment on ordinary work barge. Overwater distribution lines had to be rebuilt following 200-mph winds



H-FRAME, 69-KV TRANSMISSION LINE also carrying 24.9-kv distribution circuit is planned. Precast concrete pilings will carry overwater structures

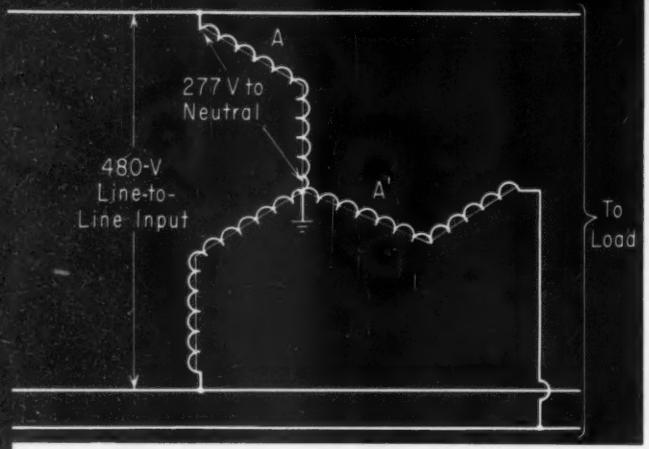


FIG 1—**GROUNDING TRANSFORMER** on 480-v system holds 277 v to ground, returns unbalanced currents

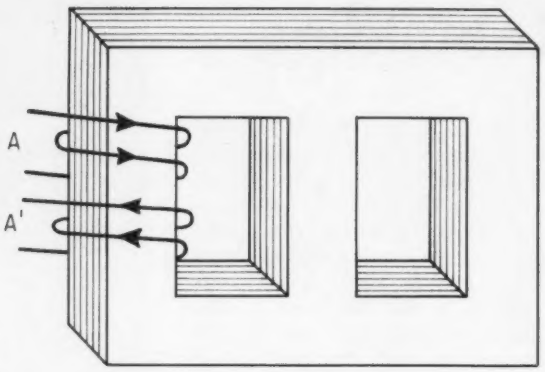


FIG 2—**TWO COILS ON EACH CORE LEG,** connected to different phases, draw magnetizing on balanced voltage

Zig-Zag Autotransformer Grounds Neutral

ALLEN C. LINDER, Distribution Transformer Dept, Westinghouse Electric Corp, Sharon, Pa.

On ungrounded 600-v class, 3-phase distribution systems, the most efficient and economical means of establishing a grounded neutral for line-to-neutral devices is with a zig-zag connected autotransformer.

Connected as in Fig 1, the transformer serves several purposes.

1. It provides a return path for the flow of unbalanced load current and distributes this unbalance equally in all three legs of the supply system.

2. It provides a return path for third harmonic currents developed in fluorescent lamp ballasts.

3. On a 480-v system it limits line-to-ground voltage to 277 v for personnel and equipment safety.

4. Under ground fault conditions it provides a stable neutral point and tends to force ground fault current to flow equally in all three lines of the supply system for simultaneous operation of over-current protective devices. In doing this, it prevents voltages on unfaulted legs of the system from going above rated line-to-ground voltage.

The zig-zag autotransformer has a 3-phase core with two coils on each leg. These coils are connected as in Fig 2. To 3-phase currents, the transformer presents a high impedance so that the only current in the transformer with balanced load on the system is its magnetizing current.

To ground currents in the neutral, the transformer presents a very low impedance. The transformer divides the ground current into three equal components, all in phase with each other. With the coils on each leg wound in opposition to each other, the flux in each leg of the core is cancelled. And, as the remaining flux has a very low value, the transformer's impedance is low as far as ground current is concerned.

Divides Ground-Fault Current

Under ground fault conditions, the transformer, by dividing the ground current into three equal components, tends to force equal fault currents to flow in the three supply legs. This current equalization helps to achieve simultaneous operation of protective devices. It also prevents line-to-neutral voltages on unfaulted legs from rising to a value almost equal to line-to-line voltage as would be the case in a grounded-wye system. This, in turn, prevents simultaneous failures of equipment on unfaulted legs of the system.

Zig-zag autotransformers have two bases of kva rating. One is the continuous neutral-current carrying capacity as might be experienced on a 277-v fluorescent lighting circuit where load unbalances might occur. This capacity is generally rated in terms of continuous neutral current and is generally specified as 65 to 70% of the rated line current of the substation transformer which feeds the system. For example, full-load line current of a 500-kva, 480-v system is 601 amperes. The maximum continuous neutral current calculated for the grounding transformer would be 65% of 601 or 390 amp.

The transformer also must have a fault-kva rating. This is generally expressed in terms of maximum available fault current, taking the reactance of the substation transformer as a base and assuming an infinite system behind it. For example, a 500-kva substation transformer, having an infinite source behind its 5% reactance, could supply about 10,000 amp of fault current at its 480-v terminals on a steady state basis. The grounding transformer must be designed to carry this current for 10 sec.

In choosing a grounding transformer, primary consideration should be given to fault rating and the transformer chosen to match the kva rating of the supply substation. Continuous neutral-current rating is secondary.

The autotransformer is approximately one-sixth the size of a two-winding transformer connected for the same purpose. It thereby gains an economic advantage, both in cost and in space required. Ratings have been developed for use with standard substations or power centers of 300, 500, 750, 1,000, 1,500, and 2,000 kva.

River-Bed Cables Precisely Located

German apparatus has ±98% accuracy in establishing position of cable and pipe; leaves communication lines undisturbed

BOOM on boat lowers the coil carrier in preparation for sinking it to locate a cable or pipe on the river's bottom

Zurich (McGraw-Hill World News)—An apparatus, recently developed in West Germany, finds with a new accuracy the position and depth of cables and pipes laid under broad, deep, and fast-flowing rivers. Its error is less than ±2%.

Especially useful in locating cables and pipes on river bottoms liable to change, this method of location is more precise than that of measuring field-intensity differences, which also has the disadvantage of employing currents high enough to disturb subfluvial telephone traffic.

The new method feeds 800-cps ac onto the cable or pipe asymmetrically to the earth. The current establishes a concentric alternating magnetic field into which two revolving coils are lowered from the surface. Voltage induced by the field in the coils varies with the coil's positions in relation to the cable or pipe. When a coil's axis is directed toward the target, induced voltage is minimum.

Thus, the lay of the cable is plotted out, and its position fixed by triangulation.

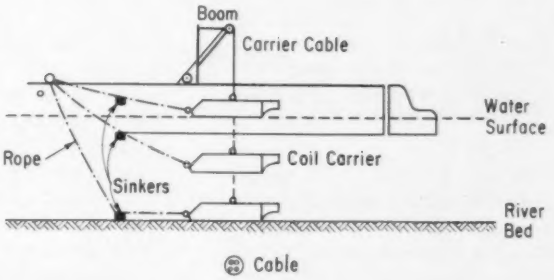
Carrier Sunk by Lead Blocks

The coils are 13 ft apart on a floating carrier which is sunk to the river bottom by six attachable lead blocks. The carrier itself is lowered from a boat by a boom and positioned thereafter by ropes. The position of the carrier perpendicular to the cable is checked by measuring the differences between the induced voltages in the coils. The latter, in watertight plexiglass cages, are revolved by a pneumatic motor.

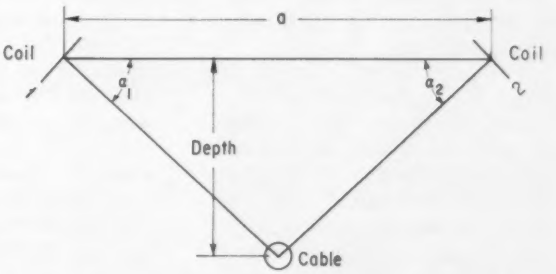
A potentiometer measures the coils' angles of tilt, and the voltage drop across the potentiometer is fed to the horizontal axis of an oscillograph on the boat. The voltage induced in a coil goes to the vertical axis of the oscillograph.

As the coil revolves, the oscillograph trace follows a curve showing induced voltage as a function of coil angle. The angle with the minimum induced voltage is easily determined. Once the angles of minimum induction are measured for both coils, the depth of the cable is solved by trigonometry.

Electrical connections between boat and carrier, and the compressed air tubes are in a 50-ft PVC tube. The new apparatus was developed by Rudolf Kunz and Arthur Heuduk of *Fernmeldetechnisches Zentralamt* (Telecommunication Central Bureau), Darmstadt, West Germany.



CARRIER, with revolving coils 13 ft apart, is shown in stages of sinking to final depth when it rests on the river bottom



PLOTTING position of subfluvial cable involves angle of minimum induction and depth of target from surface

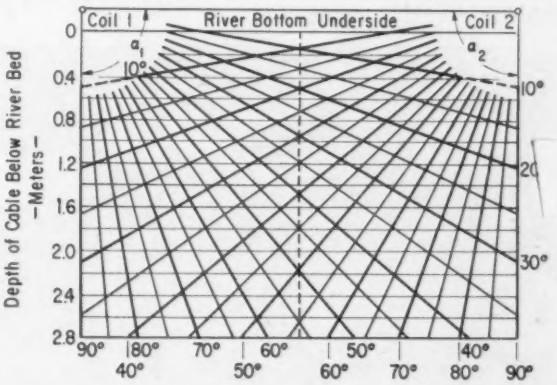


DIAGRAM is used for finding depth of cable, once the two angles of minimum induction have been determined

Scraper Cuts Labor in Cleaning Air Preheater

SHIRLEY EUGENE HESSON, Maintenance Man, Philip Sporn Plant, Central Operating Co, New Haven, W. Va.—AEP System

A job-fabricated scraper, driven by an air motor, provides a quick and easy method of cleaning flyash deposits from the sector plates on air preheaters at the Philip Sporn Plant of the Central Operating Co. Furthermore, the scraping device reduces seal wear, and increases availability of the preheater equipment.

The surfaces of the sector plates on regenerative air preheaters are subject to a buildup of hardened flyash. If not removed, this deposit will cause badly damaged radial seals, resulting in loss of air heater efficiency and costly seal replacement. The former method of removing this deposit was by reaching under the sector plate and chipping, chiseling, or wire-brushing it loose. This operation was very time-consuming and only partly effective because the extreme center of the sector plate could not be reached.

The problem was solved by removing one row of radial seals and mounting a scraper made from a 10-in. length of ½ in. flat steel, beveled on one edge, in the seal position. The bolt holes in the steel scraper were elongated to permit raising or lowering it to adjust the cut. By using an air motor to drive the rotor and by pulling the air control valve inside the air heater, a maintenance man can control and observe the results by starting and stopping the rotor at will. As one 10-in.-wide strip around the sector plate is cleaned, the scraper can be moved to the next holes, etc., until the whole sector plate is cleaned. In case of a large buildup, more than one cut should be taken to prevent stalling the rotor drive.

Each time new radial seals are installed, it is absolutely essential that these plates be cleaned. Formerly, it took two maintenance men two weeks of steady chipping to clean the sector plates of one preheater. By the new method, one maintenance man can clean one preheater in a day and a half. Based on a four-year cleaning cycle, this method saves about 136 manhours per year. And preheater downtime is reduced by about 10%. The cost of the scraper was about $2. Other tools were on hand.

Adequate Lighting Aids Utility Stock-Bin Work

Fixtures installed in the store room at Oklahoma Gas & Electric Co's service center provide direct lighting for bins holding stock items. Each bin is adequately lighted, thereby greatly reducing shadows.

The flourescent fixtures are mounted on angle iron brackets over the aisles between the bins. The brackets are bent to achieve the desired installation height slightly above the top shelf. In addition, ceiling fixtures provide general lighting for the entire stock room.

Merged Industry Effort Is Vital to Capture Heating Load

JOHN D. DAMON, Commercial Editor

The electrical industry and all its allies must band together in one concerted effort at the national level if they expect to capture the electric heating market.

On the local level, all sales allies must work as one team promoting the electric heating concept.

This was the call that sounded from Washington, D. C.'s Sheraton-Park Hotel as *Electrical World* held its Fifth Electric Heating Conference, and probably its last.

The meeting was co-sponsored by the Residential Electric Heating and Air Conditioning Committee and the Commercial Electric Space Heating and Air Conditioning Committee of Edison Electric Institute and the Electric Comfort Heating Equipment Section of the National Electrical Manufacturers Assn.

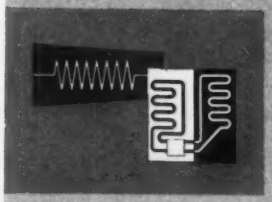
The delegates gathered in Washington primarily to meet with, hear, and convince government people connected with housing and fuels of the benefits of and excellent future for electric heating.

The Conference ran the gamut from the objectives of a national fuels and energy study, to the very important potential of the conversion market; from why builders and architects like electric heat, to a look at what's coming in equipment development.

Whether the Conference was successful will not be evident until action is taken, and results are in, on proposals urged by the various speakers.

What was evident, however, was an urge to get moving as a team, to capture the heating market.

Electrical World



ELECTRIC HEATING CONFERENCE

SHERATON-PA[illegible] HOTEL
WASHINGTON, D.C.

SEPTEMBER 25-26, 1961

PROGRAM

To Sell the Builder,

If the Fifth *Electrical World* Electric Heating Conference was the last to be sponsored by the magazine, it played its swan song with a clear-cut tune of where the electric heating market should go.

In a strongly worded final luncheon speech, EW Editor C. F. Hochgesang recommended to the assembled electric utility and manufacturing representatives, government housing people, coal industry groups and representatives for builders, architects, and other trade allies interested in the future of electric heating, the formation of a single national group "to set policy, coordinate, to sparkplug, to discipline . . . the innovation, the national aspects of marketing, and the overall promotion of electric heating."

He said he conceived of a national organization representing and drawing from utilities, manufacturers and heating and ventilating consulting engineers and other allies friendly to electricity.

He then charged each person attending to take the idea back to his management to see if such an organization could be constructed. For his part, Hochgesang offered to withdraw *Electrical World* from the electric heating conference business "as a first step toward coordinating and solidifying our efforts in gaining this electric heating market."

Why a Single-Industry Approach?

Why is this single-industry approach needed?

Because, said Hochgesang, the gas industry has very specific marketing goals for 1965. And while he admitted the electrical industry has several different and varied approaches for capturing the heating market, "we do not have a single organization with a single-minded approach, or a single policy for pushing electric heat on all fronts and for the benefit of all. The only force that holds us together . . . is the animal instinct to sell successfully."

He called for:

- A shoulder-to-shoulder attack by all sectors of the various industries. "This attack must encompass the elements of systems innovation and *all* types of marketing."
- An attack by all sectors, coordinated and pulling toward achieving the pivotal load, electric heating.
- Full informational interchange on a national, regional and local basis.
- Manufacturers and utilities working closely together to find out what each other's needs are early, and then innovating, experimenting, testing and sharing together.
- A stronger promotional approach by all concerned to match or over-match gas.

Gas men now realize that electricity is their real competitor, he said. They know they must band together for sharing information among all sectors of their industry. "As an industry they have decided they cannot afford the luxury of a divided effort, they must attack this problem with a single-minded focus . . ."

"They have taken this step. It could hurt badly." That is why a single-minded approach is necessary in the electrical industry if it expects to capture the heating market, Hochgesang said.

If cooperation is vitally needed on the national level, it is due on the local level too.

Speaker after speaker said, although in different ways, that only with all sales allies working as a sales team will the heating market be captured.

First Sell the Builders' Allies

You can't even sell the builder unless you first sell the allies around him, Virginia Electric & Power Co's C. E. Anderson said. "We want to engage him (the builder) in the acceptance and use of electric heat but our engagement ring must be forged of people—positive-thinking people who have confidence in the practical economy of electric heat, in the advantages that spell value, the dependability that speaks of quality, and the simplicity that makes it so easy to apply in any type of home. People whose positive attitude will make electric heat the natural thing for the builder to use."

Who are these people? According to Anderson, the architect who must be convinced of the operating economy of electric heat through concrete evidence in the form of billing records from local electrically heated homes of the type he designs; the banker who wants to know how readily electrically heated homes can be sold; the heating and plumbing contractor who should be made aware of the electric heating equipment that will afford him the flexibility to go after any job and give him a broader base of operation; the electrical

SENATOR Jennings Randolph reported on the objectives of a national fuels and energy study

Sell the Allies Around Him

contractor who can be shown through case experience that electric heat is economical and of real value to the homeowner; and FHA appraisers who want to be sure that electric heating equipment is durable and of long-lasting value.

But the forging of the ring must be accomplished largely by electric utilities, Anderson said. "I propose that each establish a working team to enlist the aid of these allies and to organize a coordinated builder sales program."

Cooperation is also needed in the commercial market. There is a challenge and a profit payoff for all involved if they do cooperate, Laurence E. Pierron, Commonwealth Edison Co's commercial manager, pointed out.

For the manufacturer the challenge is the further development of marketing equipment designed especially for use in conjunction with modern lighting and air conditioning. For the contractor, there is the challenge of complete technical competence in installing and servicing the equipment.

"For all there is the challenge of better dissemination of product information from the manufacturer down through the distributor, the contractor, servicing agents and customers.

"And lastly, there is a real need for aggressive and coordinated marketing throughout our industry."

Commercial Heating Is Good Business

Does it pay off? Citing personal experience, especially the Marina City project in Chicago ("our annual revenue from Marina City is estimated at two-thirds of a million dollars, with about half from the commercial area"), Pierron said, "We are convinced from our experience that the sales of commercial electric space heating is good business . . . a market that is virtually untapped. While 15% of our electric heating customers are commercial they account for about 40% of the installed heating equipment and more than 40% of our heating revenue."

Though the various allies must be cultivated if utilities are to capture the heating market, the one person who cannot be overlooked is the consumer. As Anderson asserted, he is the person who is going to buy the electrically heated home and live in it.

R. Roy Dunn, president of Potomac Electric Power Co, who welcomed the delegates to Washington, added, "A satisfied customer is the best thing we have."

While the sales curve, for electric heating for his company has become steeper each year, the one question "How steep can we make this curve in years to come?" was asked by Dunn. "The future appears very bright and the only requisite to the accomplishment of our objectives is to continue to work and think toward achieving our goal of providing our customers with satisfactory and economical heating."

Fully realizing that if the industry expects to reach the goals set up for numbers of electrically heated homes in the future it will have to tap the rich conversion

EW EDITOR C. F. Hochgesang called for a unified effort on the part of all segments of the electrical industry to capture the heating market

market, Appalachian Power Co's L. L. Koontz gave a few tips for getting this market, and at the same time pointed out how to sell the consumer.

The tips:

1. The existing home owner wants facts ("He will decide, not you").

2. He is not the least bit interested or concerned with technical engineering or research aspects of electric home heating.

3. He thinks it may cost a bit more to heat his home with electricity but he is willing to pay the difference, "if any," if he can be assured the estimates and information given to him will be backed up.

4. He wants to do business with one source—a responsible local dealer in a position to solve his problem completely.

5. He does not realize he can enjoy the advantages and benefits of electric heating in his present home at a surprisingly low installation and annual heating cost. "Make this information and service available to the customer."

6. Those endeavoring to make a quick "cash-in" on the conversion market by a "wholesale or do-it-yourself" job are asking for trouble.

7. Manufacturers, distributors, etc., must become aware that when they lose or miss a replacement job for electric they have probably lost the opportunity for another 15-20 years.

8. The solution involves all relat[illegible]es—one of the major ones is the insulation industry.

Insulation Industry Ready to Help

If this is so then the assurance that the insulation industry stands ready to help promote electric heating to the public came from Fred H. Sides, executive officer of the National Mineral Wool Insulation Assn.

Saying that insulation looks forward to assuming its proportionate share of responsibility, Sides added, "More research to discover what we better can do and what frankly we cannot do is needed." But it will come, he said, along with more explanation to the public, more simplification of technical problems.

"We shall not be found wanting in promoting to the public the virtues of your bold, new approach."

Sides added that he thinks the competition thinks

House Heating Sales Needed to Sustain

of insulation only as something that "lets those electric fellows get their costs down to where they can compete with us." Perhaps the competition has not yet caught onto what "you are really up to," he said, "but the public has understood as indicated by the unbelievable acceptance of what you have to offer in so short a time."

Mixing sagacity with humor, first day's luncheon speaker, Sen Jennings Randolph (D-W.Va.), gave an up-to-the-minute report on the objectives of a national fuels and energy study, and the question, "Will this country have a National Fuels Policy?"

What the Study Is Not

Randolph first stated emphatically what the study is not. It is not, he said:

- Intended to lay the foundation for a policy which would establish an unjust advantage for the coal industry
- For the purpose of "legislating away the freedom of choice" of the consumer
- Intended to lay the foundations for a National Fuels Policy with the avowed objective of imposing end-use controls on fuels.

What is the study trying to do? Sen Randolph said, "In an ever more complex and interdependent economy (our nation) cannot allow the fundamental base of our economy—the fuels and energy industries—to grow like Topsy, without regard for the relationships among the various segments of the economy.

"I most assuredly do not imply that such a policy would impede technical development in one region in order to promote the fuels production of another. Rather, the value of a national fuels and energy policy is that it would enable us to see the direction our economy is taking and to make the necessary economic and social adjustments."

"The complex pattern of private, public and cooperative ownership in the electrical power generating industry, and the development of the most efficient regional and national balance of energy sources in the coming decades demand nothing less than a national policy on fuels and energy."

Randolph said he hoped the study will provide the foundation for a national policy which will give adequate consideration to energy deficient regions, provide equitable incentives to insure the adequacy of energy supplies now and in the future, and assure the optimum utilization of advances in transmission and generation technology by electrical energy systems and subsequent low-cost energy to the consumer.

Warren W. Shew, publisher of *Electrical World,* emphasized why the Conference was held in Washington. "This is so we could be close to our good friends here and convince the people interested in housing and energy that our favorite son, electric heating, is a big thing to the electrical industry," he said.

"We are primarily concerned with making sure that the forecasts *Electrical World* has made come true. We hope we are wrong, but in the right direction."

Government People Speak

As stated by Shew, the purpose of the Conference was to tell government people of the benefits of electric heating. Another purpose, however, was to hear some of their plans for housing. In line with this, a panel was conducted.

Speaking for the Federal Housing Administration, William J. O'Conner said that the present formula to estimate energy consumption in electrically heated homes is inadequate.

"We are confident, however," O'Connor said, "that with the assistance and cooperation of industry groups such as the sponsors of this Conference, and the US

GOVERNMENT officials spoke on plans for nation's housing and how electric heating can play a vital role

Load Growth Progress

Weather Bureau, a new formula will be developed which will enable FHA to more accurately estimate electrical energy consumption so that home buyers may have a realistic estimate of the cost of heating with electrical energy.

"As the annual cost of heating plays an important part in decisions involving the use of electricity we are very concerned that the formula be as accurate as possible" O'Connor said.

"If you are interested in selling the heating business of a new low public housing project, get started early and don't wait until decisions have been made and plans prepared and then come in and try to get them changed," was the advice of Arthur M. Dunstan, Public Housing Administration.

PHA Experience With Space Heating Satisfactory

To date, experience with electric space heating has been "generally satisfactory," Dunstan said. "There have been no projects where electric space heating was installed that have converted to other means," although there have been some difficulties "as is the case with other types of installations."

Approximately 88,000 public housing dwelling units are on the drawing boards, and 100,000 additional have been authorized. If utilities want to sell electric space heating to these projects, get in touch with the executive director of the local housing authority, "if you can be reasonably competitive with other fuels available," Dunstan advised.

The key word in the Urban Renewal Program is "assistance," according to Edward S. Dulcan, senior field coordinator. "Essential to any successful urban renewal program and essential to revitalizing our American cities is the participation and involvement of business and civic leaders like yourself," he said. And for the next four years, $2 billion has been allocated, he pointed out.

Utilities will not be able to sustain their "terrific progress record in load growth" unless they get into the house heating market in a big way, Keynote Speaker Louis H. Roddis told the group.

"While today, and I think for some time to come, the principal source will be coal, it is important in maintaining a steady or decreasing cost pattern to be able to shift your energy source. This is something the gas people can't do," the president of Pennsylvania Electric Co said, "and their pattern of increased rates over the last ten years principally resulting from their own wholesale problems, has been a distinct advantage to us in an area where we happened to be reducing rates."

Electricity is something different from gas, Roddis pointed out. It isn't just a source of heat but a different source of energy. It can use any of a large number of sources. "It is a superior source inherently and has a much better future cost pattern. These are our two big advantages. If we don't do something about it, this

KOONTZ

RODDIS

PIERRON

ANDERSON

isn't just by itself going to produce 5.2 million electrically heated homes by 1970 which *Electrical World* forecasts," Roddis said.

He feels there is a "very bright future ahead" but if "we're going to continue this growth rate in the face of the competition we've got, then we'll have to get aggressive in this heating business.

"We think we have a lot to offer. Regardless of what our competitors say, you can get an electric heating installation for lower initial cost and much lower maintenance cost. The fact we can forecast a much more stable energy cost for the future, and our competitors can't, is a real selling advantage which the customers knows."

All of these advantages are obviously hurting, Roddis pointed out, because the competitors' advertising is beginning to hit those points.

Housing Market for 1960's Set at 16 Million

Around 1,325,000 dwelling units will be built in the United States this year, and in the 1960's there will be a market for 16 million new units, according to Dr George Cline Smith, senior partner, MacKay-Shields Associates.

"These 16 million homes are going to be a huge market and there's going to be a lot of profit in it for those people who analyze the trends and play it as smart as possible," he said.

Hitting home, Dr Smith pointed out, "If the electric home heating market you people come up with can reduce the monthly operating and carrying costs of a house . . . if you can come up with a system which will reduce the cost of operating a house, then I could say you are very much in tune with this market which lies ahead. . ."

The single-family market is not likely to get too

Few Revolutionary Changes

much bigger in the next several years, Dr Smith commented. Less than a million will be built this year compared to 1.8 million in 1950.

The 16-million market will come from a population increase of 34 million in this decade plus a replacement rate of 300,000 units a year.

Furthering the insulation story, Wood Conversion Co's Gordon Erickson said, "Electric space heating has developed rapidly during the past five years, due, in part, to the use of adequate insulation, double glazing, and other measures to reduce over-all heat loss, which has enabled it to be fairly competitive with other systems."

But, Erickson said, more accurate data is needed on such things as: What are the heating demands on a house under different environmental conditions; how important are solar radiation and internal heat loads; and how do calculated heat losses compare with the actual measured energy consumption?

To answer these and similar questions, Erickson's company sponsored a research program on two electrically heated homes. Tests are now being conducted.

New Equipment Developments Told

The question, "What's coming in equipment development?" was answered by Fred Kreiser, general sales manager of Edwin L. Wiegand Co, William L. McGrath, chief engineer for Carrier Air Conditioning Co, and Stewart Segerstrom of Lennox Industries.

Speaking for direct heating, Kreiser said, "Most manufacturers agree that this next decade is not going to bring about any dramatic or revolutionary types of devices." But he said this is mainly because the present array is "quite impressive," although the future will bring improvements in their performance, aesthetics and ease of installation.

"Dispersed units," as Kreiser referred to them, are going to prevail, he said, because the electrical contractors and distributors have made up their minds that they are not going to lose the electric heating market to the warm air industry and plumbing trades.

The units also have the advantage of ten thermostats instead of one, and room-by-room control, he said.

Terming them "the right heater for the right area," Kreiser said he also believes the trend will be toward the least temperamental devices, those that are least prone to annual maintenance and regular service.

"Utilities are going to be more and more interested in the quality of distribution and installation because once these devices go in right, they usually perform right."

Baseboard Equipment Leveling Out

Kreiser also foresaw: Baseboard equipment leveling out with heat intensities down around 125 to 175 w per sq ft; gathering interest in heat storage combined with direct heating devices in one or two areas only; and a lot of attention to heaters that lend themselves to the conversion market. While improvements will not be dramatic, they will simplify installation and improve closeness of temperature control, Kreiser said.

What's coming in heat pumps, is better heat pumps, new types of units and a steady growth in the business, McGrath predicted.

"Even granted that there have been some fingers burned in the somewhat turbulent growth of this business to date, you can't for long hold back what is basically right.

"And the heat pump is ultimately the right way to heat a building," McGrath said, "because modern buildings are not just 'heated' but they will have year-round climate control."

Where serious problems have been encountered with

MODERATOR A. F. Southwick, with C. F. Kreiser, W. L. McGrath, and S. Segerstrom, held panel on equipment developments

reliability of maintenance of heat pump systems, these problems can usually be traced to inadequate equipment design and lack of suitable proof testing or field testing, bad installation or lack of service responsibility, or all three, McGrath said. But, he pointed out, substantial strides have been made in improving reliability.

"New developments will push still farther north the design temperature bands in which heat pumps can be justified," McGrath predicted. With equipment now known, most of the continental United States can now be covered with suitable equipment, he said.

Discussing fresh air electric heat, Segerstrom said the central-ducted electric heating system has many advantages: System fresh air can be introduced into the home at a controlled rate, the lowest possible fuel cost will result, and fresh air is introduced to control humidity, or to freshen the air, at a controlled rate which will greatly help reduce the operating cost; and central air conditioning can be easily added to it.

Warm Air Industry Now Active in Heating Promotion

"The warm air industry is now very active in the promotion and manufacturing of electric heating equipment," he added.

Future developments in the electric heating field may include integrated lighting, heating and air conditioning, new energy sources, and off peak heat storage, a panel concluded.

Rochester Gas & Electric Corp's James D. Johnson detailed the experiences of his company in installing an integrated system.

"Increased lighting levels will require maintenance of lower temperature, greater air quantities, increased space, and higher installation and operating expenses," he pointed out, "But economic evaluations must justify these expenses."

He warned, "Don't provide high-level illumination without air conditioning, and always have the air conditioning system completed first."

New energy sources, General Electric Co's J. J. William Brown said, include thermo-electric conversion, thermionic conversion, fuel cells and magnetohydrodynamics.

Processes Require Further Knowledge

All of these processes require further knowledge—of the processes themselves, of materials, and of the actual geometry and configurations which will produce the best and most reliable performance. Citing that research and development have been stepped up he said, "The outcome of this accelerated pace . . . will certainly provide an accelerated gain of scientific and engineering knowledge. This knowledge will affect the development of these unconventional power processes and significant, although probably evolutionary, progress is assured."

But how will these potential new energy sources and new methods of energy conversion affect electric heating and cooling? "They will have very little effect," Brown said. "Some may find their way into electric utility systems and help to keep the cost of electric power the bargain it has always been. This will assist your work, but it is no panacea," he said.

The use of electrohydronic off-peak storage systems can help utilities sell electrical energy whenever the sale is most profitable to the utility during any 24-hr period. In turn, the consumer then uses the stored heat at his discretion, Ray Edwards, Edwards Engineering Corp, said.

"From the economic standpoint, the off-peak system brings the thinking and desires of the customer and the utility closer together," Edwards pointed out. "The off-peak system permits the utility to open a tremendous

DISTRIBUTION can help sell electric heating panel of electric utility and manufacturer representatives agreed

Distribution Can Help Sell Electric Heating

new national market for electrical energy without the addition of more generating capacity."

Many of the speakers called for cooperation from and with trade allies. That these allies like electric heat was pointed out by three speakers.

M. A. Wright, a builder from Huntington, W. Va., in constructing a development agreed to build Gold Medallion Homes until he met buyer resistance. It never came.

"All our homeowners are completely satisfied with all-electric living," he said. "Their monthly budget payments have been reasonable and operating costs have been well within estimates.

"Why do we like electric heat?" he concluded. "It was major factor in upping our annual sales volume from $400,000 to $2 million," he said.

Richard Haft, builder from Ft. Lauderdale, Fla., said he built all-electric homes, "simply because we were convinced we would sell more homes more rapidly and with less sales resistance with electric heat and that our net profit would therefore be greater."

Installing the heat pump, Haft said, he found there are far fewer service calls on these units than with the gas-fired furnaces, and the same service man can now be called upon for repairs and all adjustments to both the heating and cooling system.

Would Like Promotional Partnership

"To keep the public sold, you must keep the builder sold," he said. "Post-selling, that's what we desire. Don't follow us up, follow up with us."

"Public buildings offer the real volume for energy consumption," C. S. Buchart a York, Pa., architect said. "Unlike residential promotions, public work has to be designed right from the start, it must go for competitive bids and the heating system must work from the beginning."

Buchart said he went into electric heat because he was searching for a system of heating adaptable to modern structures having minimum floor, wall and ceiling space for concealment.

A few things he learned were: Be sure of all calculations ("they may have to be defended in court"), the best equipment is the best buy, and today lower operating cost is more obtainable than ever before.

"Seek and find continually better solutions to problems facing owners even though these solutions may break with precedent and the search prove time-consuming." Buchart advised.

Distribution can help sell electric heating a panel of experts agreed. Paul W. Emler, American Electric Power Service Corp, C. B. Osborne, Electric Power Board of Chattanooga, V. A. Rydbeck, General Electric Co, and Walter D. Brown, Middle West Service Co participated.

Emler told how AEP decided to make distribution practices, especially underground service, work as a sales tool.

Decisions were: Have distribution engineers investigate all known means of reducing underground costs and develop new ways of reducing this cost still further; require the developer or customer to pay for any extra cost of underground service above the cost of a comparable overhead system; and allow considerable flexibility in the way sales promotion money, set aside to develop the electric appliance and heating business, is spent.

After detailing three situations where modern distribution was used as a sales tool, Emler commented, they "have convinced us that with a definite policy, with strong team work between the manufacturer, the utility distribution engineering department and the utility sales department, distribution practices can be an important help in selling electric heat.

Engineers have never been noted for their communicating ability, Brown pointed out, so sales people can take the initiative in learning about the new designs from the engineers, and about the new equipment being used on company systems. This will offer some concrete evidence for the sales people to display to the customer, evidence that the electric facilities are capable of supplying the quantity and quality of service required for this deluxe market.

Technical Equipment Improving Rapidly

Technical equipment is improving rapidly, Brown pointed out, and new flexible designs and layouts are improving the systems, and the operating procedures are improving.

"A continued and increasingly close relationship between sales, engineering and operation personnel will help all three do the job better.

Osborne said that it pays to promote an all-electric subdivision. The average cost of distribution facilities for 25 isolated houses cost $432, while the average cost in an all-electric division was $245, according to estimates he made.

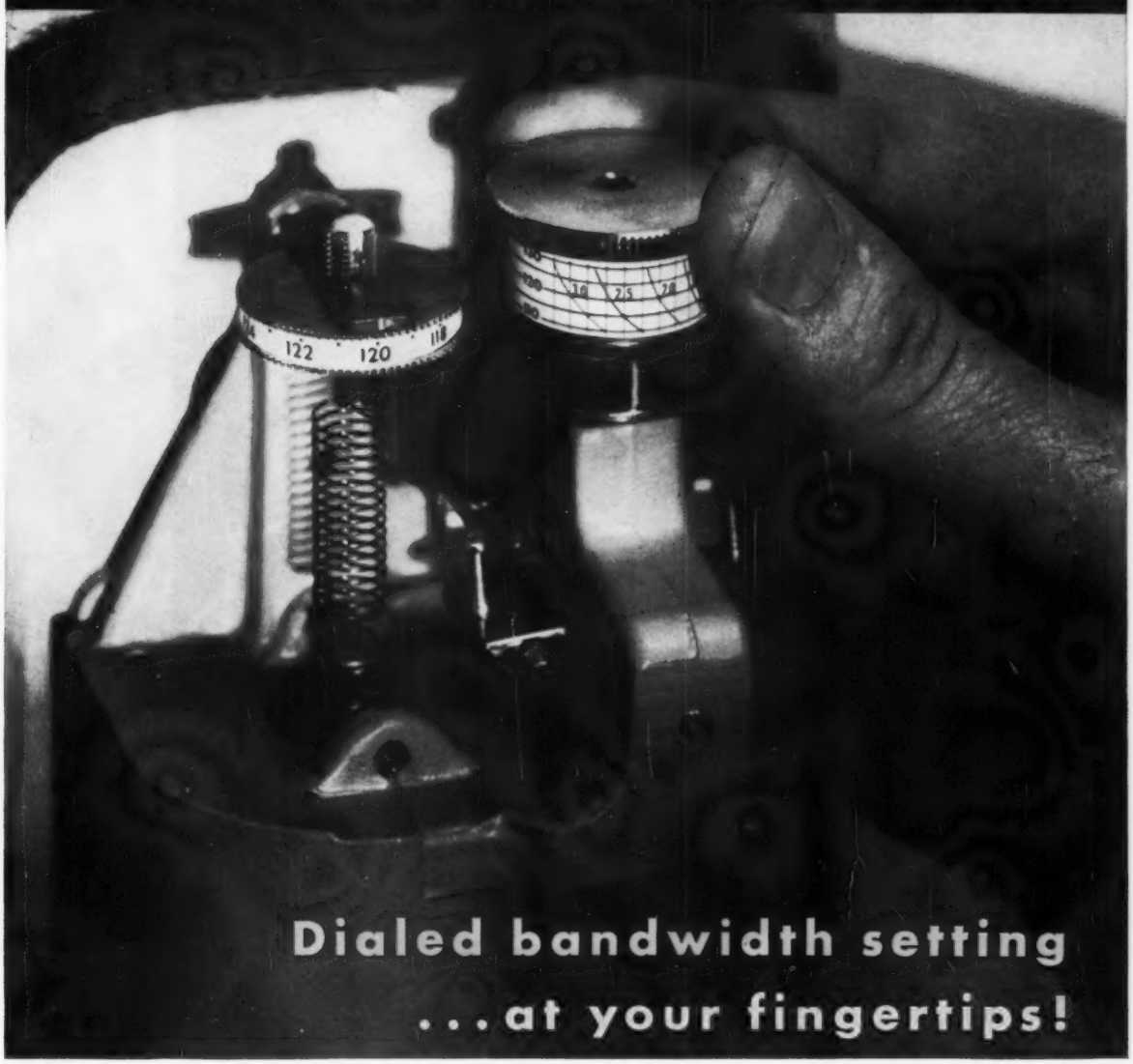
The network analyzer, transient analyzer and digital computer are being used increasingly by distribution planning engineers, Rydbeck pointed out. With these tools the engineer is able to take into account many variables and to design systems of maximum reliability, maximum flexibility, and lowest expense for now and the future.

These computer studies have helped the utilities to hold the line on distribution investment and to make large developments of electrically heated homes within the reach of more and more people, Rydbeck said.

The Conference ended with eight roundtables, each concerning a subject speakers covered in the first day-and-a-half.

Reprints of the report on EW's 5th Electric Heating Conference, along with complete conference proceedings, are available at $10 the set.

ANOTHER STEP AHEAD IN VOLTAGE REGULATION



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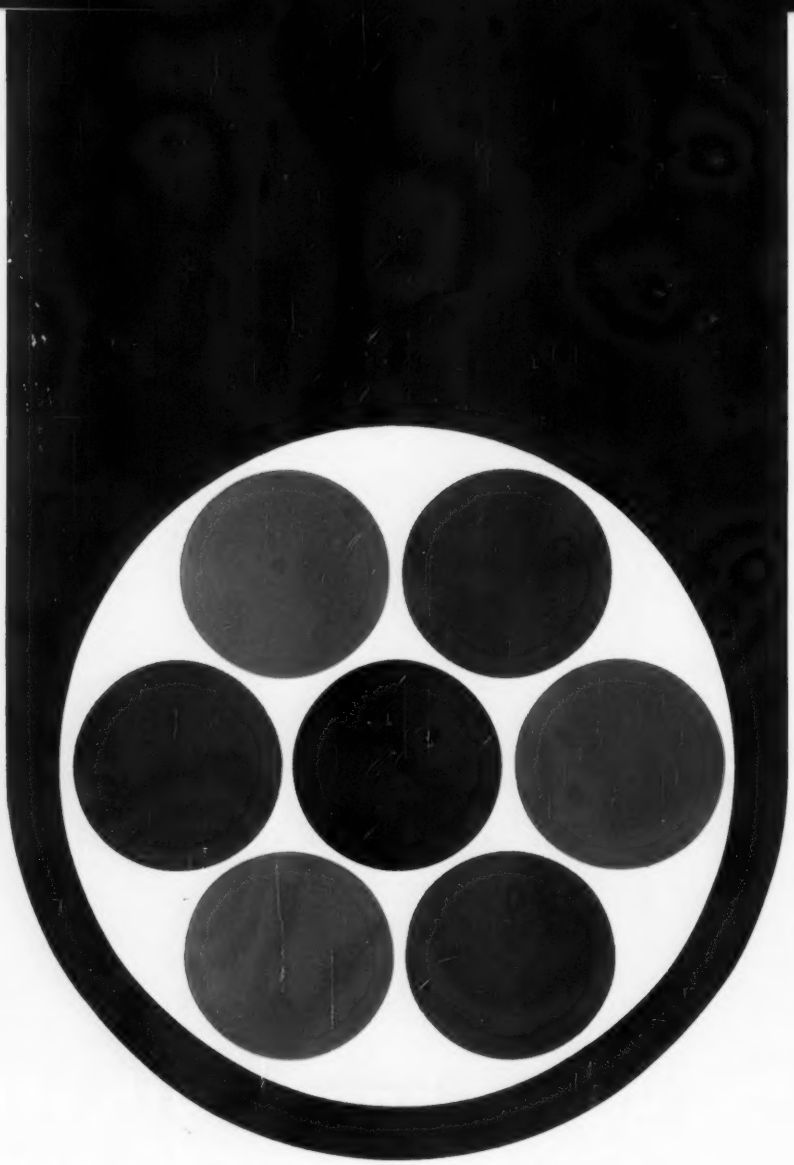

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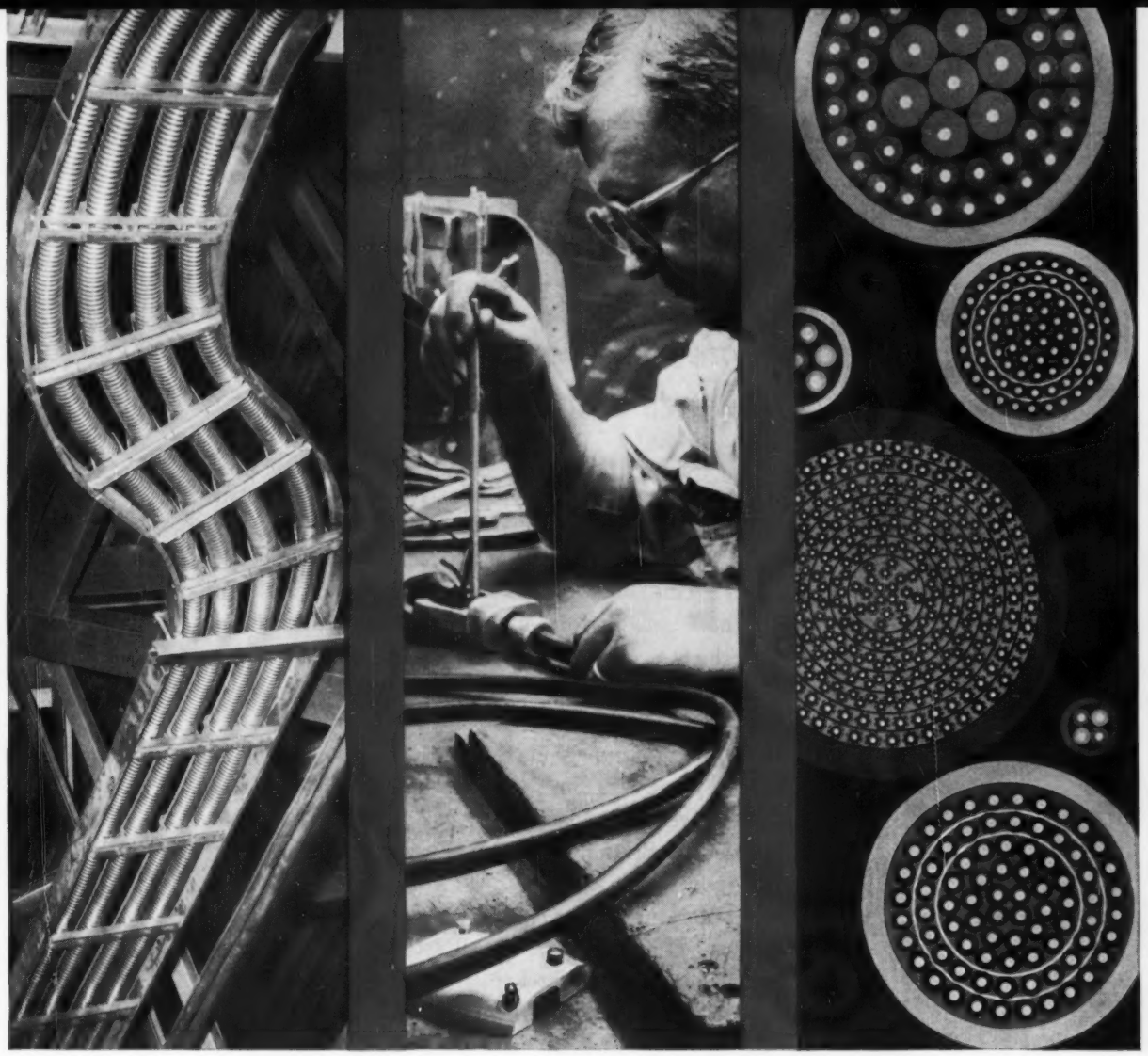

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VALUE 767% RATING

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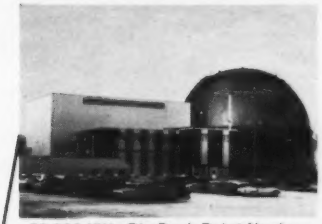
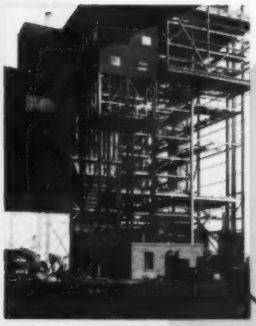
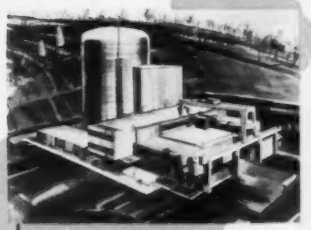


50,000 KW • Big Rock Point Nuclear Plant • CONSUMERS POWER COMPANY

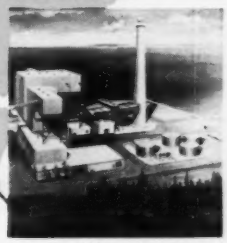


305,000 KW • Waukegan Station, Unit 8 • COMMONWEALTH EDISON COMPANY

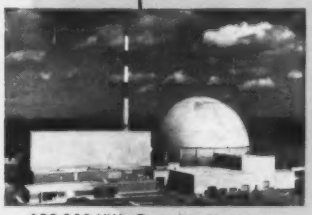
320,000 KW • Fisk Station, Unit 19 (Engineering) • COMMONWEALTH EDISON COMPANY



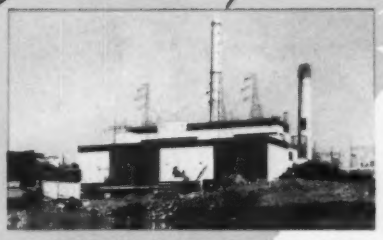
40,000 KW • Peach Bottom Atomic Power Station • PHILADELPHIA ELECTRIC COMPANY



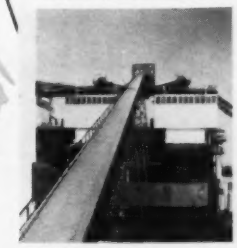
144,000 KW • B. L. England Generating Station ATLANTIC CITY ELECTRIC COMPANY



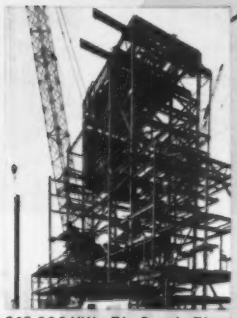
180,000 KW • Dresden Nuclear Power Station* • COMMONWEALTH EDISON COMPANY



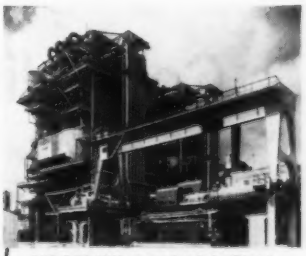
190,000 KW • Dickerson Station, Unit 3 POTOMAC ELECTRIC POWER COMPANY



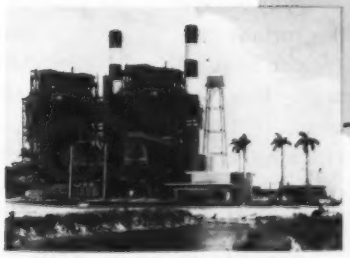
66,000 KW • Delaware City Power Station, Unit 3 DELAWARE POWER & LIGHT COMPANY



265,000 KW • Big Sandy Plant (Construction) • KENTUCKY POWER COMPANY, AMERICAN ELECTRIC POWER SYSTEM

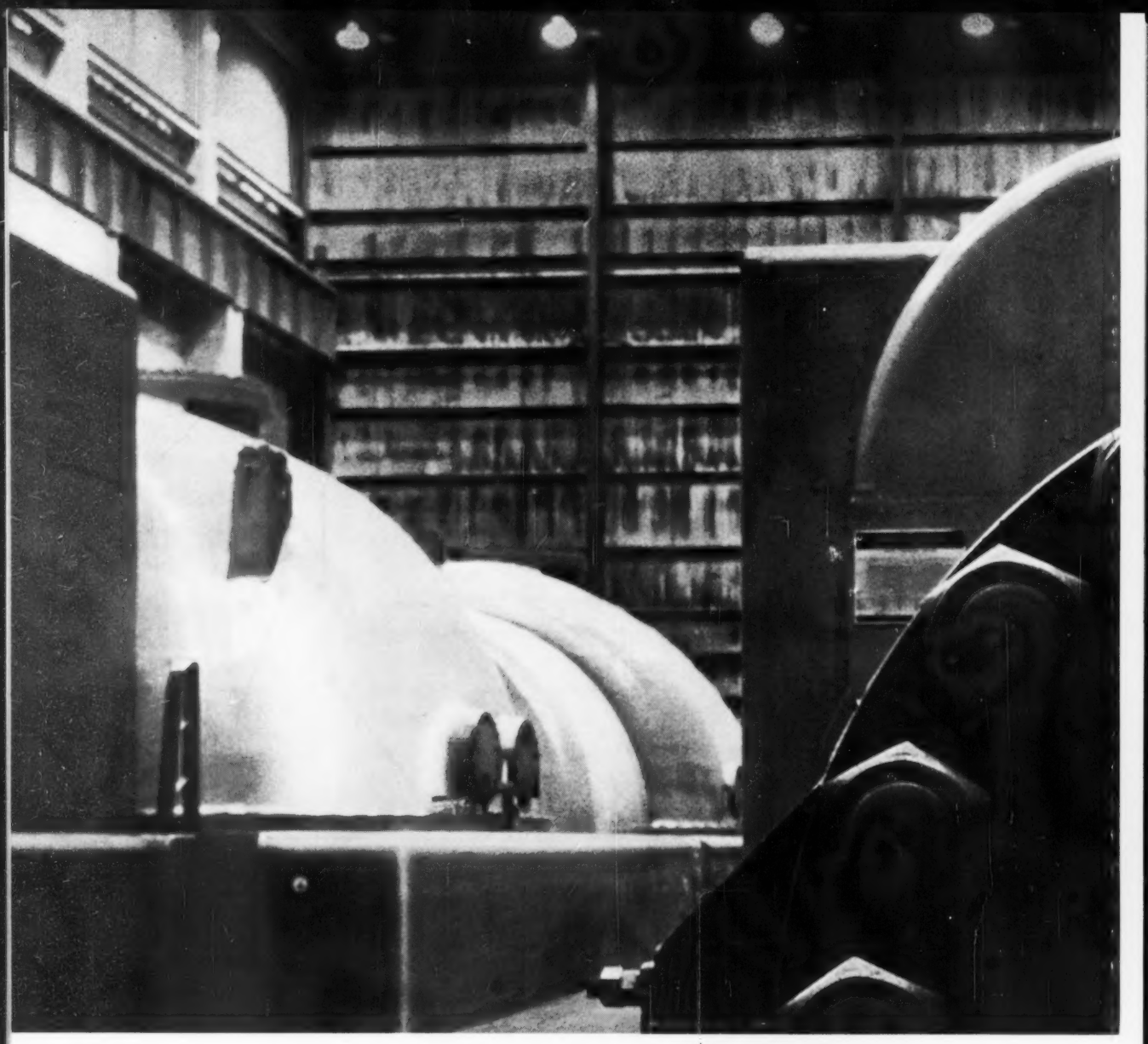


320,000 KW • Lauderdale Plant, Units 4 & 5 • FLORIDA POWER & LIGHT COMPANY



480,000 KW • Port Everglades Plant FLORIDA POWER & LIGHT COMPANY

*General Electric Company, Prime Contractor



Con Edison uses Gulfcrest® oil in new

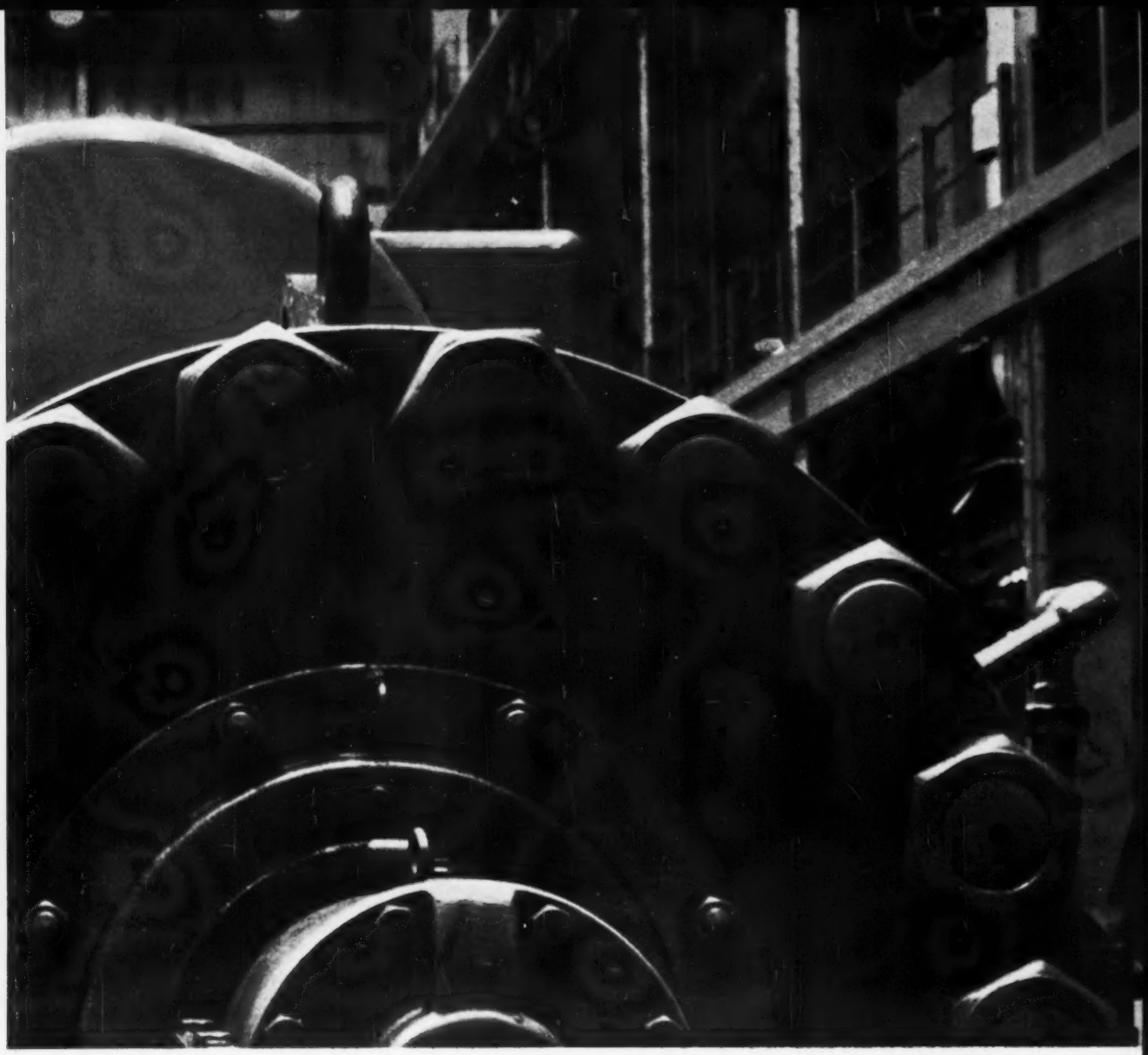
GULF MAKES THINGS

Recently, the Consolidated Edison Company of New York, Inc., installed a huge 335,000 kw turbine generator in its new Arthur Kill Station (Staten Island). This is one of the larger units operated by this company and represents a sizable investment.

Protection of such an investment requires a very careful selection of the turbine oil. As David Napier, General Superintendent of the Arthur Kill Station points out, "First of all, even this large unit still depends on the same number of bearings to support heavier high speed rotors. We expect a turbine oil to provide non-failing protection for these bearings year in and year out.

"In addition, we want a turbine oil that maintains its color stability as well as low neutralization number. And, it must be able to protect the metal components of the lubricating system and governor mechanisms against rust. Finally, we look for an oil with non-foaming characteristics."

Gulfcrest oil meets these requirements. In fact, Gulfcrest is used in more central power stations in Gulf's marketing territory than any other turbine oil.

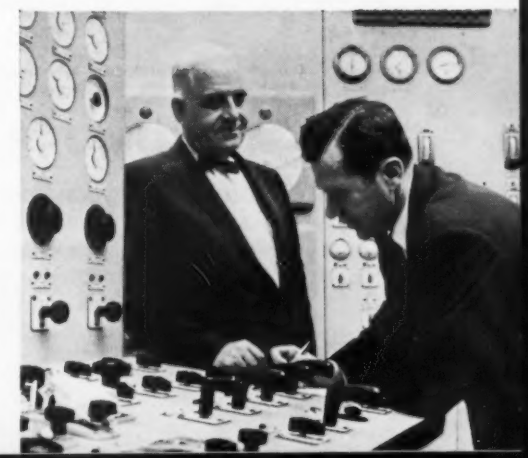


335,000 kw unit...
RUN BETTER!

Why not see for yourself how Gulf makes things run better! Call your nearest Gulf office for additional information. Or write for Gulfcrest literature.

GULF

GULF OIL CORPORATION
Dept. DM, Gulf Building
Houston 2, Texas



David Napier, General Superintendent, Arthur Kill Station (left), discusses lubricating requirements with Mike Mitchell, Gulf Sales Engineer.

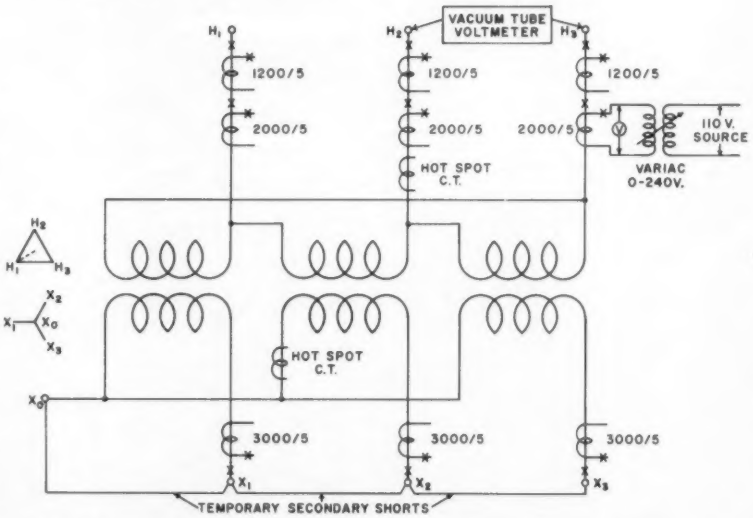
Voltage Method Checks CT Ratios

H. J. PANTIS, Electrical Engineer, Philadelphia Electric Co, Philadelphia, Pa.

Because the standard current method of testing current transformers in the field is difficult and expensive, it was not suprising that the idea of performing these tests by a voltage method rather than by the application of current should present itself. For years, the standard acceptable method of ratio testing current transformers has required a source of heavy current supplied by cumbersome equipment: regulator, loading transformer and a number of ammeters.

For larger-ratio current transformers on power transformers and generators (for example, 4,000/5 and 10,000/5), the expense and time for current-testing in the field is almost prohibitive. In addition, the expense and complications are increased when the CT's are not accessible because of their locations in power transformer or generator enclosures, in which cases CT testing must be coordinated with the assembly schedules of the parent equipment.

It appeared that ratio testing by the voltage method would be satisfactory if the burden of the measuring devices would not cause an appreciable voltage drop in the power transformer winding. It was decided, therefore, to try the voltage method on the CT's of a power transformer whose primary winding and CT are in series. It was expected that the impedance drop across the power-transformer primary would be negligible because of the small current taken by the potential measuring devices. In other words, it was expected that the voltage measured across the terminals of the power transformer would be the same as the voltage induced across the CT primary or nearly so. The results of these tests on transformers as well as on other apparatus where the CT is not accessible indicate the voltage method of CT testing is entirely satisfactory. Some results are shown here.



VOLTAGE METHOD for ratio checking current transformers on 80-Mva transformer relied on 110-v ac input and VTVM. It yielded the data below, left

The measurement of the voltages involved in the tests were made as shown. The voltage applied to the CT secondary was in most cases chosen from its ratio: i.e., for 120 to 1 ratio, we applied 120 v to the secondary. One volt was then read across the power transformer primary terminals (in effect, then, the CT primary) with a vacuum-tube voltmeter. The burden of the VTVM is so low that the drop across the series power winding is negligible, particularly when the other windings are shorted. Care should be taken in selecting a voltage so that the CT will not be overexcited and thus cause error in the ratio measurement. The last line of data below illustrates this point. It is suggested that shielded leads be used on the VTVM to keep measurement inaccuracies to a minimum.

On the basis that field testing of CT's is done primarily to identify taps rather than to establish the fundamental accuracy of the CT's, the voltage method appears to be promising indeed. Moreover, we have no indication that the voltage method is not as accurate as the current method. It is attractive because it requires only a low-energy source and a few readily portable components, and, of course, it is less expensive than the current method. Because of our relatively limited experience with the voltage method, we are proceeding cautiously with its use, but we expect results as good as the current method. We believe its use will become general in Philadelphia.

80,000-Kva, 3-Phase Transformer, Class FOA 66.8/133.7△-35.6 Grd Y/20.56 Kv

CT Secondary Taps	Design Ratio	Calculated Ratio	CT Secondary Volts	CT Primary Volts	Test Current Milliamperes
A1—B1	40/1	39.8/1	80.0	2.01	550
A1—C1	160/1	160/1	160.0	1.0	88
A1—D1	240/1	240/1	240.0	1.0	60
C1—D1	80/1	80/1	80.0	1.0	180
B1—D1	200/1	200/1	200.0	1.0	71
B1—C1	120/1	120/1	120.0	1.0	120
B4—D4	160/1	160/1	160.0	1.0	105
A4—B4	240/1	240/1	240.0	1.0	70
A4—C4	300/1	300/1	150.0	0.5	30
A4—D4	400/1	400/1	200.0	0.5	20

Current Transformer, JKL 5, 15 Kv, 1,200/5 Ratio

Design Ratio	Calculated Ratio	CT Secondary Volts	CT Primary Volts
240/1	242.2	99.5	.41
240/1	244.0	115	.47
240/1	245.0	116	.471
*240/1	270.0*	336	1.25

* It is evident from this test if overvoltage is applied to the CT under test, errors will result. It is suggested that an ammeter be inserted in the test source to indicate if saturation occurs

2 GENERAL ELECTRIC PROMOTIONS BOOST YEARLY REVENUE $7629

They did it in northwest Minnesota.

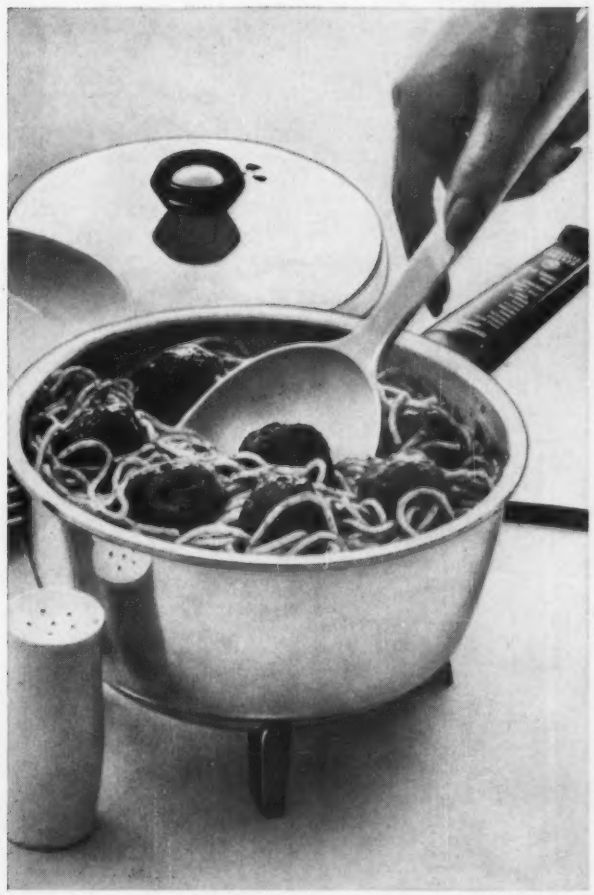
Eight local REA offices sold 2600 General Electric Coffee Makers and 466 All-Purpose Cookers—in a mere matter of *weeks!*

Ask Axel H. Johnson, Asst. Office Mgr., Kandiyoki Electric Power Assn., Willmar, Minn. He'll tell you that, based on national average, those sales punched up power revenues $7629 yearly—or $635 per month! And he'll show you how easily dollars like that can pour into *your* pocket!

Find out about it—now! Get complete information on General Electric's Power-Use Programs, by writing to Merchandising Section 22CE, Portable Appliance Dept., General Electric Company, Bridgeport 2, Connecticut.

Progress Is Our Most Important Product

GENERAL ELECTRIC

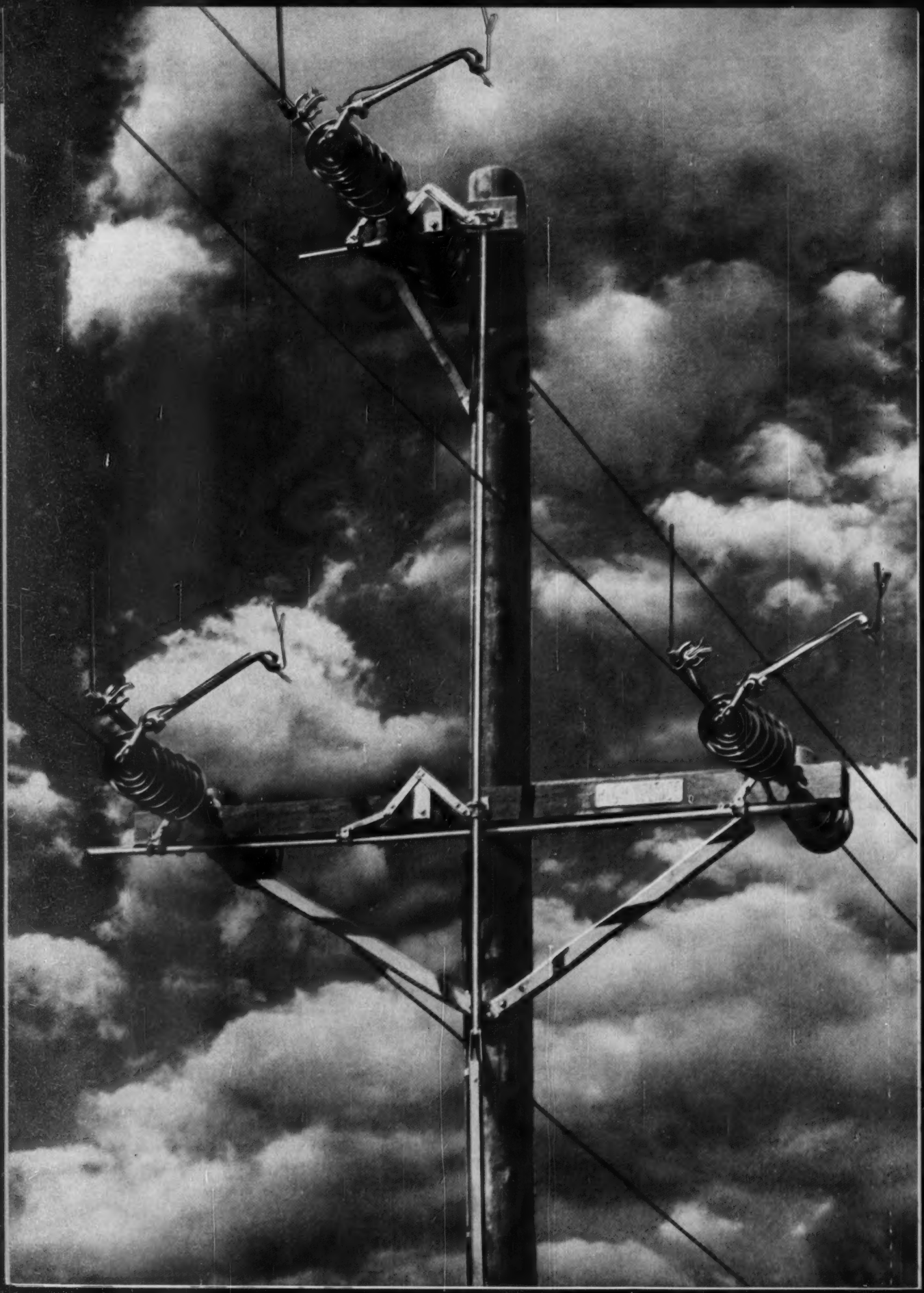


PROMOTION #1

466 ALL-PURPOSE COOKERS SOLD! General Electric All-Purpose Cooker gives controlled heat for stewing, simmering, frying. Great for delicate sauces and unusual one-dish meals. Temperature control removable, cooker immerses for easy cleaning and hangs on wall.

PROMOTION #2

2600 COFFEE MAKERS SOLD! The General Electric Peek•A•Brew® Coffee Maker has a built-in gauge that tells how much water to use as you fill, how many cups are left as you pour. Brews 3 to 10 cups of coffee automatically, keeps it hot.



DEPENDABILITY is *not* suddenly

Reliable performance is seldom achievable overnight. It is the product of sound basic design, careful manufacture, and conservative rating. And, beyond this, the years of experience and continual improvement that winnow out hidden problems common to most new products.

Your air break switches are the most significant single elements in your distribution lines. KPF's half-century record of operating dependability, of mechanical surety, is your comforting assurance of performance and safety.

KPF
AIR BREAK SWITCHES
Standard for half a century

Can you afford to specify other than KPF?

Particularly since KPF switches almost invariably cost less.

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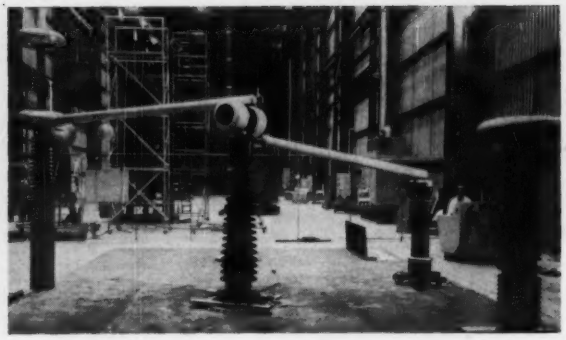
6379

News of Manufacturers

NEW HV EQUIPMENT LABORATORY, Santa Clara, Calif. is described to Electrical World editors by Federal Pacific Electric's President Thomas M. Cole, second from right



230-KV BUSHING receives power factor check on Schering Bridge. Low-voltage balancing circuits are in Faraday cage below. Tower at rear left is 2,000-kv impulse generator

FPE's HV Facility Now in Full Operation

One of the largest plants in the West devoted to the manufacture and development of high-voltage distribution and control equipment is now in full operation at the new 226,000-sq-ft plant of the Federal Pacific Electric Co in Santa Clara, Calif. T. Cole, president of Federal Pacific, said in a recent discussion with *Electrical World*, "Depressed prices on electrical equipment are here to stay—our new 70,000-sq-ft Santa Clara laboratory facility is part of FPE's answer to the price squeeze. We are currently producing a precisely cost- and quality-engineered line of equipment. Continued emphasis on research and development will insure to us a fair profit within the existing price levels."

Leonard P. Shelley, vice president of Federal Pacific and manager of its western manufacturing group, said the multi-million-dollar Santa Clara plant incorporates a substantial investment in new production and testing equipment in addition to facilities previously located in four FPE plants in northern California. While floor space has been reduced by 20%, the new plant can handle 20% more volume than the five old units. The plant will manufacture power circuit breakers, HV switching equipment and transformers.

The new lab is equipped with two 60-cycle, 1,050-kv, high potential sets; two impulse generators rated at 2,000 kv (two 1,000-kv units cascaded), 25 kw-sec; and 300 kv, 12 kw-sec; a 1.5-meter sphere gap for very high-voltage calibration and measurements; two 250-kv precision Schering Bridges with plus or minus ½% accuracy, and a variable frequency M/G set rated 450 kva at 400 cycles.

Regarding high-voltage equipment, Cole said "Federal Pacific is currently developing a modular-type circuit breaker for 500-kv service —500 kv, because we believe that this will be the commonly accepted transmission voltage in the near future. Of course, it will be possible and economically feasible to adapt the modular-type 500-kv breaker for use on 345 kv."

Control of test equipment is centered in five test stations with portable consoles built for the laboratory at FPE's Los Angeles plant. All these, together with the associated Model Shop, Chemical and Photographic Laboratories, reportedly comprise one of the most scientifically advanced high-voltage research and testing centers in the country.

Production facilities are divided into machine, welding and fabricating shops; separate areas for assembly of power circuit breakers, power switching equipment, distribution and power transformers. A completely self-contained bushing manufacturing plant within the Santa Clara facility employs numerous production and test equipments designed by FPE to obtain highest standards of electrical and mechanical dependability in this critical component of high-voltage systems.

The new manufacturing plant and laboratory, which employs over 500 people, is located about 50 miles south of San Francisco.

New Transformer Insulation Drying Facility in Operation

Electrical insulation for Allis-Chalmers Manufacturing Co power transformers, produced at its Terre Haute (Ind.) plant, is now being conditioned by one of the most modern vacuum drying systems in the world. The drying chamber equipment, designed and supplied by the F. J. Stokes Corp, Philadelphia, combines the effects of vacuum and automatically controlled heat by strict regulation, insuring high quality electrical insulation.

The drying chamber measures 18

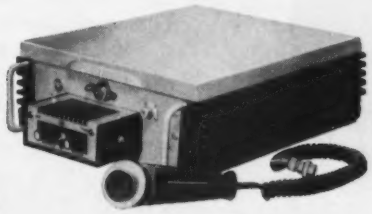
(*Continued on page* 60)

RCA "LD" 2-way radio has the guts to stand up to the toughest jobs!

There are rugged places where men, trucks and 2-way radios have to go, and each has to be a proven, reliable performer. In 2-way radio, this means quality must be built-in to take the gaff—quality such as only the leader in radio and electronics can offer—in the new RCA "LD" (Low battery Drain). Quality and price are combined in this dependable RCA equipment to give you the very best performance at the lowest cost. Use it on the roughest roads—Security Sealed Circuits are your assurance it can take it. Leave the radio on when your vehicle engine is turned off—battery drain is negligible—transistors are used in circuits where they have been proven to be most dependable.

It took experience and daring to bring you today's RCA 2-Way Radios. It meant discarding preconceived notions about circuits and redesigning with transistors in key places for reliability with economy. And it involved engineering a host of other advanced features to assure fine message intelligibility, and long component life at moderate cost.

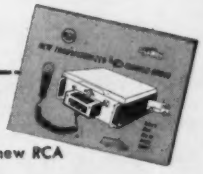
Your RCA Communications Specialist will be glad to show you why the "LD", dollar for dollar, feature for feature, is today's greatest 2-way radio value. Or send coupon for further facts.



RCA

The Most Trusted Name in Radio

RADIO CORPORATION OF AMERICA



RADIO CORPORATION OF AMERICA
Telecommunication Center, Dept. AC-45
Meadow Lands, Pa.

☐ Please send me FREE literature on the new RCA Transistorized Mobile Radio.

☐ Have RCA Communications Specialist contact me and explain why this is today's best value in 2-way radio.

NAME_____ TITLE_____

COMPANY_____

TYPE OF BUSINESS_____

ADDRESS_____ PHONE_____

CITY_____ ZONE____ STATE_____

Are YOU

utilizing the advantages of

SANGAMO'S *Type BH-6* Current Transformer?

The BH-6 has received wide acclaim from the electric power industry. It leads the field in the 600 volt indoor-outdoor class. If you are not using the BH-6 . . . you should be. Why? The extra benefits!

You have a choice of three dual-range ratings (a Sangamo first) that eliminate costly transformer changeouts due to load growth. A 400/800:5 BH-6 gives high accuracy from 40 to 1600 amperes. In addition, the BH-6 is also available in four single-range ratings.

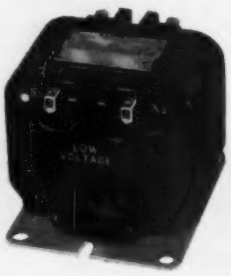
Notice the big oval-shaped window. One or TWO large conductors pull easily through the smooth opening.

And the BH-6 is completely molded in a color-coded epoxy resin . . . a durable, protective encapsulation. These lightweight, compact transformers are pre-tested and shipped to you with a certificate of accuracy.

BH-6 transformers are available for all applications; through-type, flat-bar primary, auxiliary high base, conduit or duct mounting, or in transrack assemblies.

No other current transformer can provide you with the inherent advantages of the BH-6.

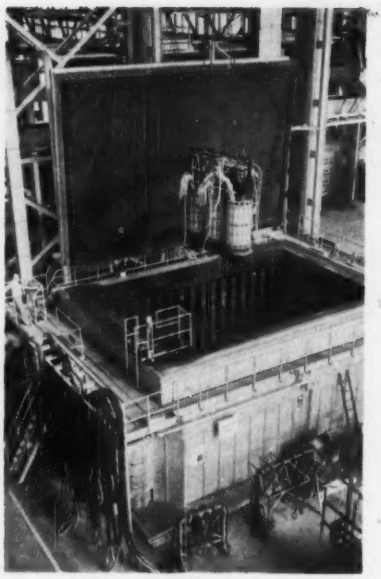
The companion for the BH-6 is the new T-6 indoor-outdoor 600 volt class potential transformer. Completely encapsulated in a color-coded epoxy resin, the T-6 has 0.3 accuracy at W and X burdens, yet it is the smallest and lightest in its class as it weighs only 14½ pounds. Add up the benefits. Standardize on Sangamo transformers.



SANGAMO ELECTRIC COMPANY

SPRINGFIELD, ILLINOIS, U.S.A.

PX61-2



VACUUM-DRYING EQUIPMENT combines effects of vacuum, automatically controlled heat under strict regulation

ft by 27 ft and is 26½ ft high. It is designed for full vacuum application and is structurally reinforced with 21 in. W. F. I-beams on 14½-in. centers. As many as five power transformers can be processed in the chamber at one time. Easy loading and unloading of the chamber is made possible by its full-opening top cover, which is hinged along the 27-ft side and can be swung up to a vertical position for these operations.

Previously, a typical insulation load required from one to three weeks to dry. Now, the drying cycle is completed in well under 24 hours. In addition to the lower manufacturing costs which are thus obtained, the rapid drying cycle insures that no insulation aging takes place although a higher degree of dryness is achieved than is possible with conventional equipment.

The new vacuum drying equipment, operating at pressures as low as 4 mm. Hg., and with built-in-controls to automatically keep the heating limits within safe bounds, serves to dry out the transformers thoroughly, in a shorter time, and at a lower temperature, than would be possible by drying at atmospheric pressure.

(*More News of Manufacturers, p* 62)

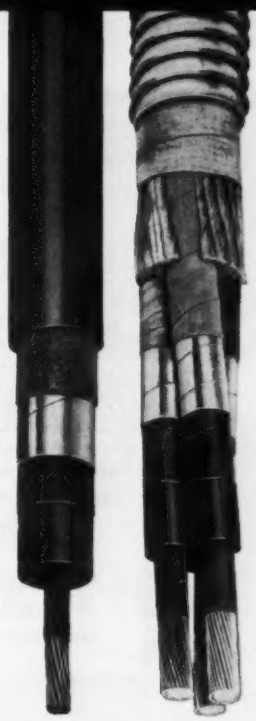
How Circle exceeds the specs to give you...

MAXIMUM DIELECTRIC STRENGTH

EVERY order for power cable calls for certain specifications to be met. At Circle, the point is not how well these specs are met – but rather how far *they are exceeded.*

Example: the well-known "double-voltage" test as required by IPCEA-NEMA. The table below demonstrates *one of the ways* Circlesheath Type RR power cable exceeds specs to give users maximum performance. Circlesheath also excels in ozone resistance, long-term stability and other essential power cable requirements.

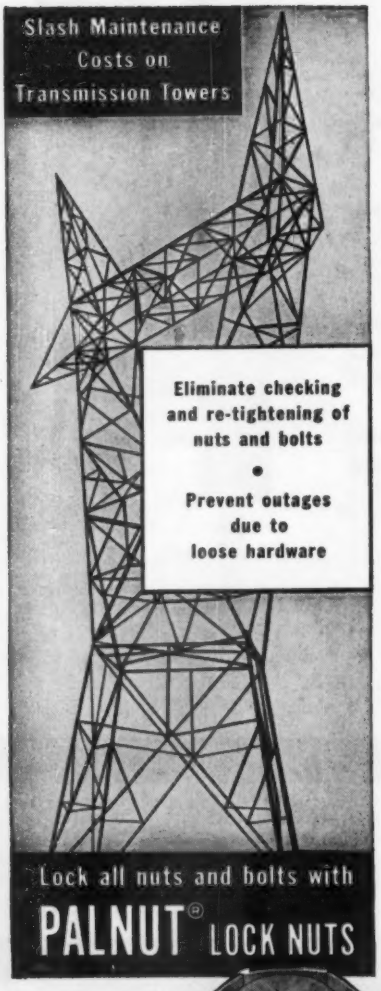
Power cable reliability is no haphazard achievement. It requires continuous supervision by men who not only care enough but know enough to produce the very best. Specify Circle on your next job – there's no finer cable made.



CIRCLE WIRE & CABLE CORP.
SUBSIDIARY OF **CERRO CORPORATION**

PLANTS: Maspeth and Hicksville, N. Y. **SALES OFFICES & WAREHOUSES:** In all principal cities.
Rubber Covered Wires & Cables • Varnished Cambric Cables • Plastic Insulated Cables • Neoprene Sheathed Cables • "CIRTUBE" EMT

CABLE SIZE	RATED VOLTAGE	DOUBLE AC TEST VOLTAGE	CIRCLE B'KDN VOLTAGE	MAXIMUM STRESS IN VOLTS PER MIL
2 AWG	5KV	28KV	48.3KV	454
1/0 AWG	5KV	28KV	40.3KV	356
500 MCM	5KV	31KV	44.6KV	307


Slash Maintenance Costs on Transmission Towers
Eliminate checking and re-tightening of nuts and bolts
•
Prevent outages due to loose hardware
Lock all nuts and bolts with
PALNUT® LOCK NUTS
Applied in seconds—
Stay tight for life

PALNUT Lock Nuts are the lowest-cost, most reliable method of assuring permanently tight tower bolts, for these reasons:

- **Vibration-proof.** Unfailing double-locking spring action holds assemblies to original tightness.
- **Easy, fast assembly.** Light in weight, easily carried, free-spinning, quickly lock with ¼ to ½ turn of linesmen's wrench.
- **Weatherproof.** Heavily galvanized to equal or exceed ASTM specs. Still perfect after 30 years' service on many towers.
- **Low cost.** PALNUTS cost a trifle more than one cent in average sizes.
- **Small Space.** Need only 3 bolt threads.

Specify PALNUTS on all new towers —add them to existing towers. Send for Free Samples and Data

THE PALNUT COMPANY

Division of United-Carr Fastener Corp.

51 Glen Road Mountainside, N. J.

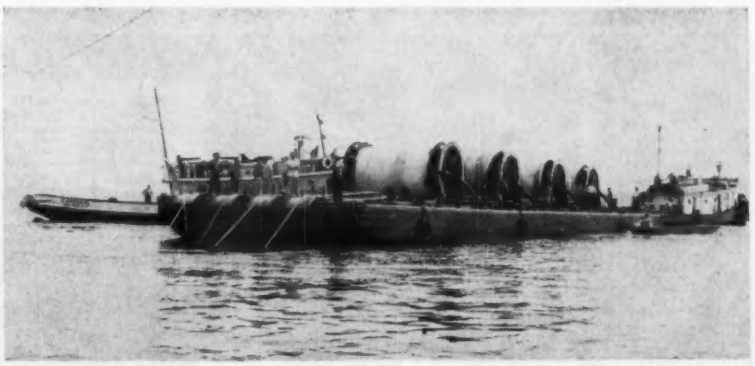
IBM Announces Faster Control System

A faster, more powerful 1710 control system has been announced by International Business Machines Corp. IBM's initial entry into the field of process control, the 1710, was introduced last March as an "open loop" system. When used in this manner, the solid-state 1710 scans instruments, feeds data into a computer and then prints instructions telling an operator what action to take in controlling a process.

Now the loop has been closed. Utilizing two new units, the 1710 system no longer requires intervention by an operator to regulate a process. The adjustment of instrument settings can be made fully automatic. Additions are a 1712 multiplexer and terminal unit and a 1711 data converter, model 2.

The multiplexer serves as the connecting link between process instruments and the control system. The data converter transposes instrument signals into language understood by computers. These units, together with an IBM 1620 computer, comprise the expanded IBM 1710 control system which has closed-loop capability. It is a building-block system which can handle applications ranging from data logging, monitoring and operational guidance to complex closed-loop control.

Approximate price range of the system is from $125,000 to $250,000. Approximate rental is from $3,000 to $6,000 a month. First installations are scheduled early in 1962.



Longest Oil-Filled 115-Kv Cable Ordered

Engineering discussions and plans started three years ago have resulted in the award of a million-dollar underwater cable order to The Okonite Co (subsidiary of Kennecott Copper Corp) from the Puget Sound Power & Light Co.

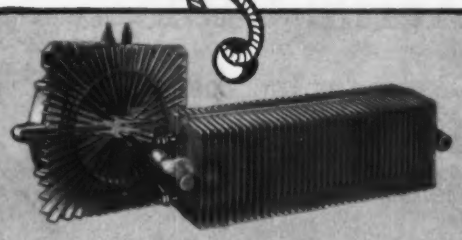
The order involves 82,000 ft of oil-filled 115-kv cable. Included are four sections, nearly three miles long, the longest of this type cable ever made in the United States, as well as four lengths over 6,000 ft long. The cable itself will weigh 11 lb per ft and will be nearly 3⅛ in. in dia. Eight heavy-duty railroad flatcars will be required to transport the giant reels to the Pacific Coast.

These high-tension cables are similar in design, though longer and larger in diameter than those furnished by Okonite three years ago to transmit electricity from the St. Lawrence Power Project, under Lake Champlain to Vermont.

The cables will be installed in Puget Sound next spring across the East Passage to Maury Island and across the Colvos Passage to Vashon Island at a maximum depth of 672 ft. They will be capable of carrying 170,000 kva.

Participating in the negotiations on behalf of the purchaser was the consulting engineer firm of Stone & Webster Engineering Corp of Boston. This group will inspect the cables and supervise the comprehensive testing program at Paterson plant.

Compare and YOU will *Install*



Comparison from the standpoint of safety engineering will show there's no unit in electric heating to match Electromode's exclusive All-Aluminum Safety Grid. Only Electromode has this feature, tested and time-proven to be the safest on the market. It's the grid that boosted Electromode to leadership in the electric heating field. There are no exposed hot wires. No glowing coils. All heating elements are permanently embedded deep inside a cast aluminum sheathing, assuring positive protection against fire, shock or burn.

Electromode

flameless ELECTRIC HEAT

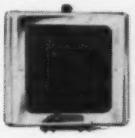
Comparison from the standpoint of performance will show that Electromode's Aluminum Grid has many other advantages, too. Aluminum is rust resisting, non-corrosive. It is one of the best known metals for conducting and radiating heat. Yet its surface temperatures in operation remain amazingly low. Trouble-free Electromode grids are guaranteed five years against burnout and practically eliminate the need for service calls. More and more contractors are installing Electromode because comparison has shown it is the cleanest, safest and most efficient flameless electric heat on the market today. Continue to install Electromode and build up your dividends in mounting customer satisfaction.

ELECTROMODE LOW-LEVEL BASEBOARD HEATERS

Offer the last word in modern heating for any home. Electromode perimeter heating provides the comfort of radiant warmth along outer walls, under windows and across floors. Come in varying lengths. Customized, matching fittings permit a pleasing baseboard effect in any size or shape room.

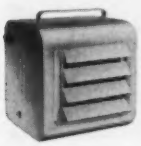
WALL MODEL DOWN-FLO HEATERS

Utilize Electromode's efficient Down-flo principle. Clean, odorless, fan-circulated heat is evenly distributed throughout the area. Ideal for cold hallways, recreation rooms, and other big rooms. Come in both Recessed and Surface Mounted models. All have Electromode's exclusive Aluminum Safety Grid.



BATHROOM and SMALL ROOM HEATERS

Just right for small rooms. Perfect for bathrooms, where extra warmth is frequently welcomed. Provides quick, economical warmth with the flip of a switch—at the temperature you select. Automatic thermostat keeps it there. Smart styling adds to bathroom beauty.



PORTABLE SUSPENSION TYPE

Especially useful for supplying extra heat in widely separated areas. May be plugged in temporarily or suspended from swivel-type brackets. Automatic thermostat. Adjustable louvers permit flexibility in directing fan-forced warmed air where most desired.

COMMERCIAL DOWN-FLO TYPE

Here are units that provide the perfect answer for many hard-to-heat areas. These sturdy heaters come in a wide range of capacities. Abundant, evenly fan-circulated warmth is assured for factories, auditoriums, schools, churches. Automatic thermostat is tamper-proof. Complete heat regulation may be arranged from a remote central control point.

MEET EVERY HEATING NEED

Electromode's complete line embraces more than 400 types, models and capacities of flameless electric heating units and systems for every purpose. Included are wide choices for residential, commercial, industrial and farm application.

On your next heating problem you'll make a wise decision to contact your nearest Electromode representative or write for free literature to:

Electromode

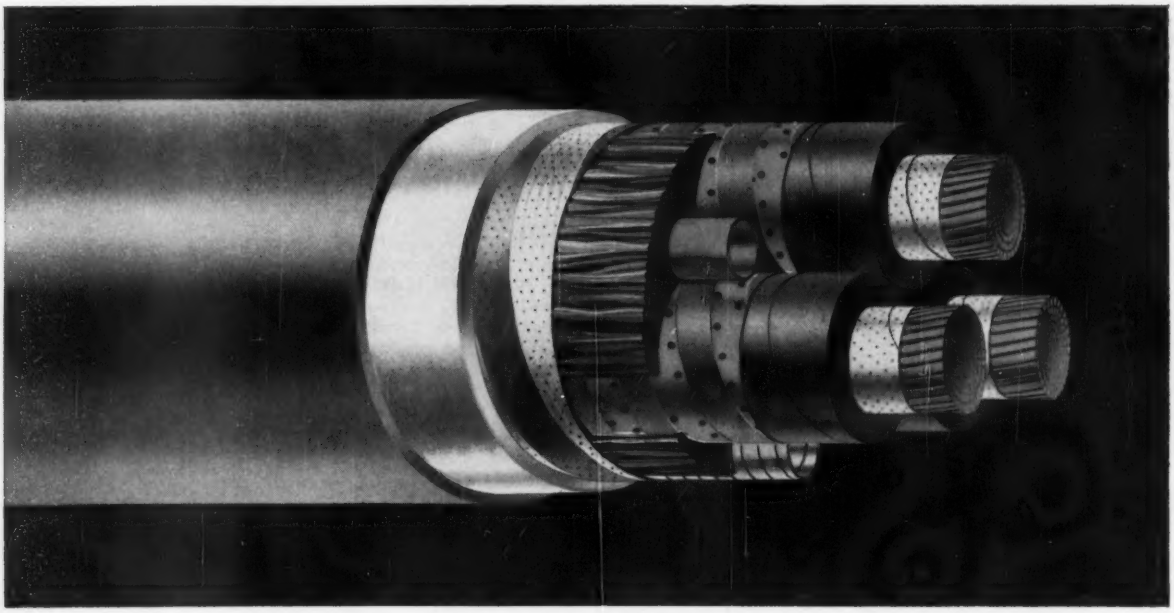
Division of Commercial Controls Corporation

ROCHESTER 3, NEW YORK

DEVELOPED BY PHELPS DODGE FOR THE ELECTRIC UTILITY INDUSTRY

New 69 KV High-Pressure, Gas-Filled Aluminum Sheath Aerial Cable

Provides Practical, Economical Design for Increasing Transmission Requirements in Congested Areas

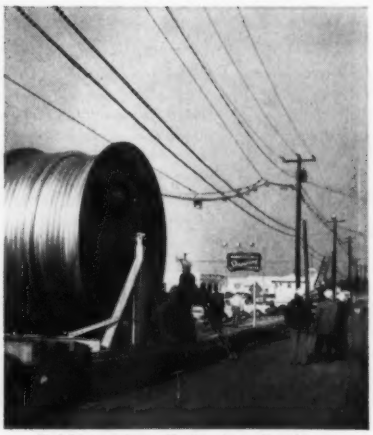


CABLE SPECIFICATION

Voltage	69 Kv.
Rating	75 MVA
Ambient air temperature	25°C
Conductor temperature, normal	75°C
emergency	90°C
Nominal shipping length	1000 ft.
Cable construction	
Three compact round conductors	800 MCM
Graded 1 to 6 mil wood pulp paper insulation	315 mils
Two steel spiral gas channels O.D.	0.760"
One copper tube gas channel O.D.	0.625"
Seamless tubular aluminum sheath	180 mils
Extruded high density polyethylene jacket	125 mils
Overall diameter	4.15 in.
Nominal operating pressure	200 psig.
Joints	Mechanical
Potheads	HPG type
Gas supply	Central Gas Cabinet

TESTING SPECIFICATION

Power factor at 90°C	below 1.0%
Ionization factor	Minimum
Sixty cycle voltage tests to ground	
Full reel	47 Kv.
Sample withstand tests,	
6 hour	107 Kv.
one minute	175 Kv.
Impulse withstand voltage test to ground (1½ x 40)	
Cable and splice	350 Kv.
Load cycle test, 60 Kv. to ground, 100°C copper	Stable



Cable was installed using aluminum blocks supplemented by periodic placement of steel blocks for mechanical strength. 69 KV cable was pulled into position from reel on trailer to messenger.

Phelps Dodge has designed and fabricated a versatile new three-conductor 69 KV aerial cable system for Long Island Lighting Co. specifically engineered for its rapidly growing suburban areas. This aluminum sheathed paper insulated high voltage power cable may be installed on distribution poles and offers the advantage of aerial cable performance at a cost substantially lower than equivalent underground cable systems. In communities with steady population and industrial growth, it meets a current need for transmitting increased electric power at high voltages where open wire systems cannot be installed.

The entire circuit includes 10,000 feet of aerially installed cable and 3000 feet of directly buried underground cable. All directly buried underground cable was provided with a high density polyethylene jacket for both mechanical and corrosion protection. Mechanical joint sleeves, developed and introduced by Phelps Dodge for use with aluminum-sheathed cable, together with installation techniques that assure dependable cable performance, were used in this LILCO project.

Other features of this advanced aerial cable are its relatively light weight and small diameter for its voltage and rating. A simple pressure control system maintains the nitrogen gas at a nominal 200-pound pressure.

The first aluminum sheathed aerial power cable installed in the United States was designed and fabricated by Phelps Dodge in 1953. Over the past years, this type cable has gained increased acceptance with utilities as an economical and practical answer to special transmission problems.

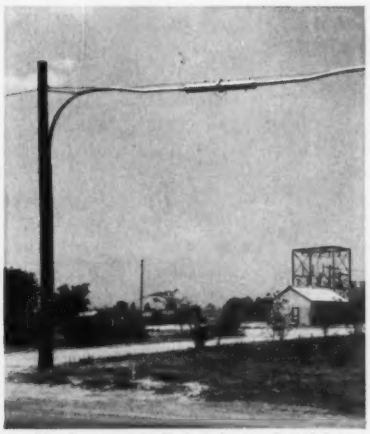
Pressurized aluminum sheathed aerial cable was first installed in this country in 1957. During that same year, design was begun on the cable system which is described here. Phelps Dodge can furnish aluminum sheathed power cable systems within a wide range of higher voltage ratings, and has designed and fabricated a 345 KV cable of this type with a capacity of 500 MVA.

For further information and engineering assistance on your particular problems, contact your local Phelps Dodge representative.

Underground portion of cable is shown in trench for direct burial. A section of underground portion was drawn thru a steel sleeve which had been driven under a heavily traveled parkway. An extruded high density polyethylene sheath was applied over aluminum sheath for mechanical and corrosion protection of underground sections.

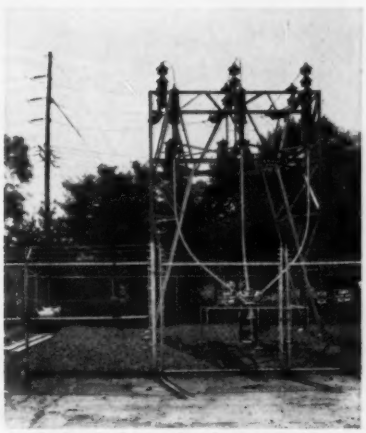
PHELPS DODGE COPPER PRODUCTS
CORPORATION
300 Park Avenue, New York 22, N.Y.

P MINE TO MARKET D

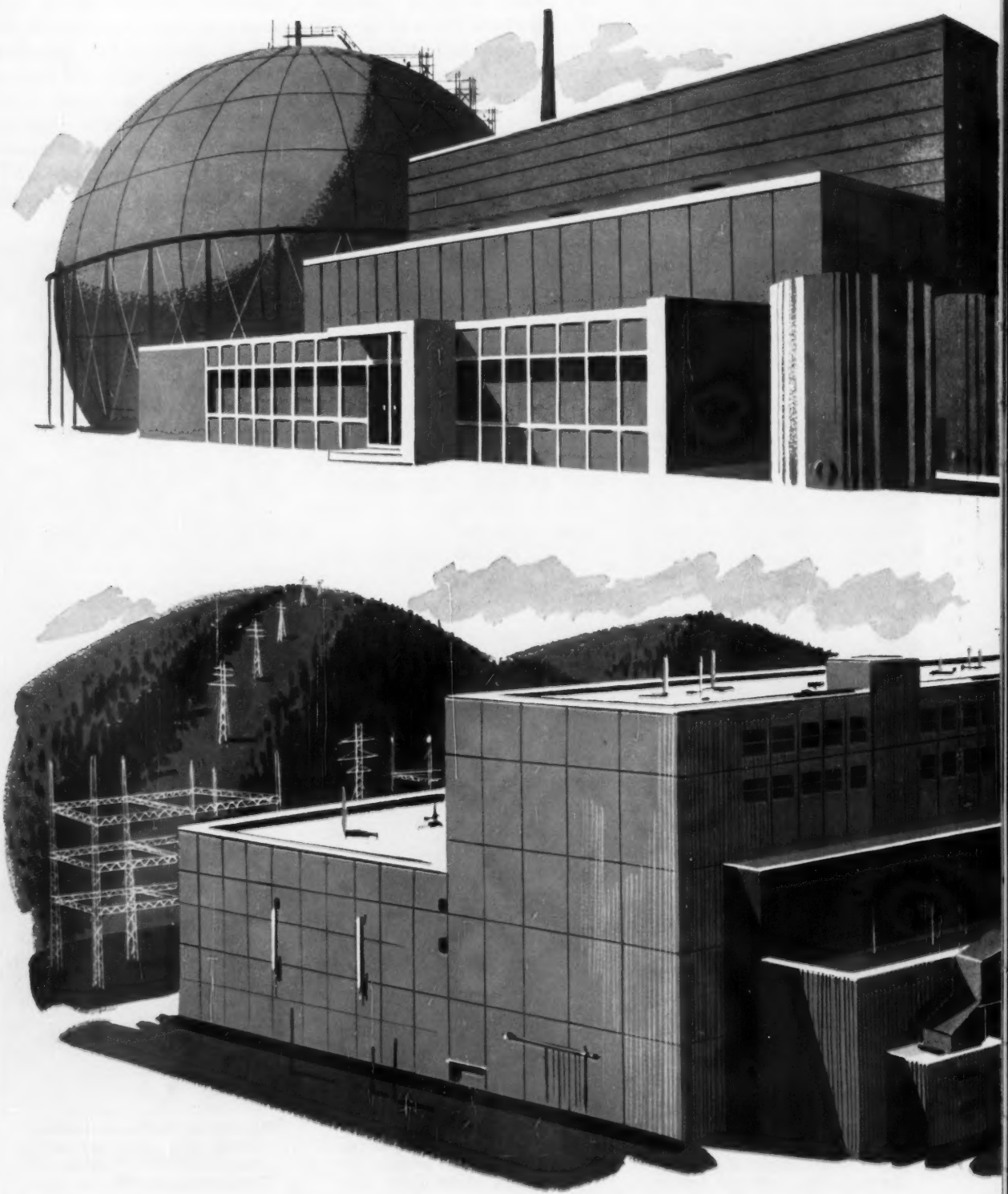


Underground section of cable emerges from ground in a specially designed ventilated riser, spliced to aerial section. Note neat appearance of cable, including normal joint.

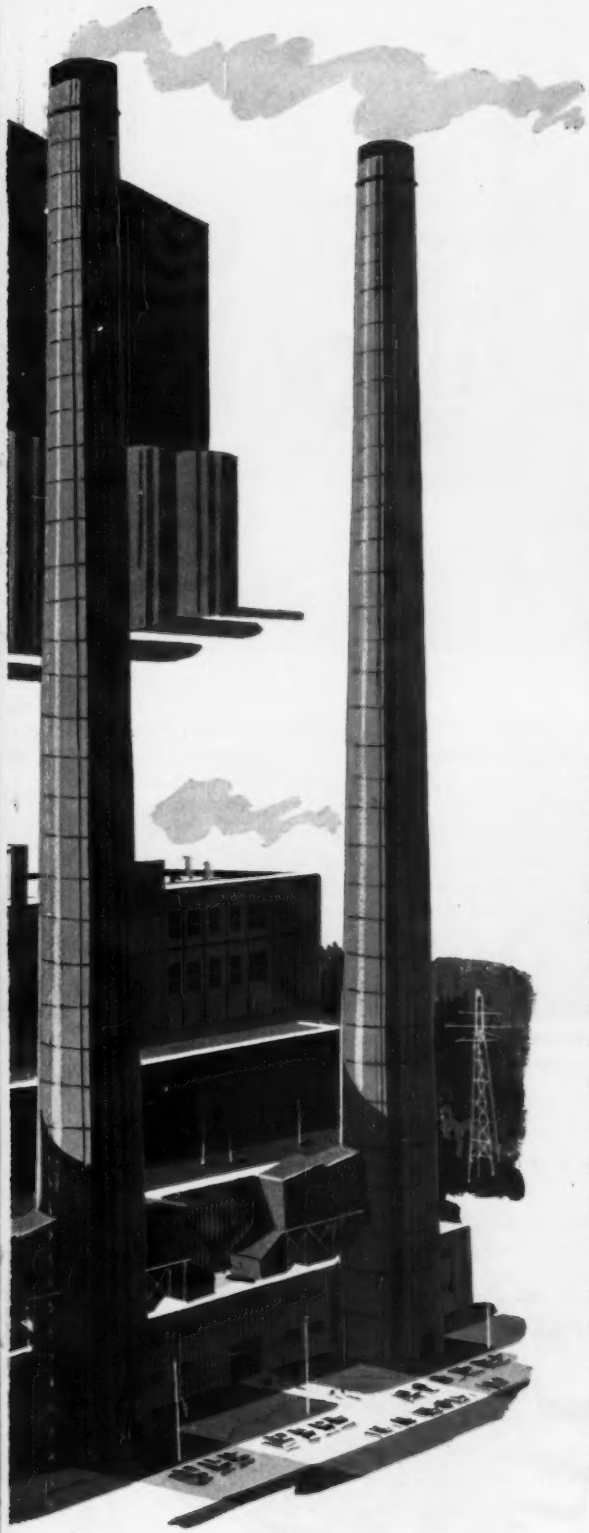
At local intersection, 69 KV cable shares poles with telephone cables, secondary and 13 KV primary. Use of aluminum sheath aerial cable overcomes objections to overhead open wire systems in communities.



Mechanical termination assembly showing both aerial and underground terminations of cable system. Termination assembly, an above ground spreader type, is fabricated completely of aluminum.



POWER PLANT PRODUCTS HEAT ENGINEERED BY FOSTER WHEELER:
Central Station and Industrial Steam Generators • Steam Condensers and Pumps • Cooling Towers
Pulverized Fuel Systems • Feedwater Heaters • Packaged Steam Generators • Nuclear Components



Whatever the challenge

Atomic power plants were not achieved overnight. In a large measure they were built on fundamental knowledge developed for conventional steam power plants.

Thoroughly grounded in these fundamentals, Foster Wheeler has designed, engineered and built more nuclear steam generators than any other firm in the world.

Today, nuclear-born technology at Foster Wheeler contributes directly to superior equipment of every description . . . equipment that earns a better return on plant investment.

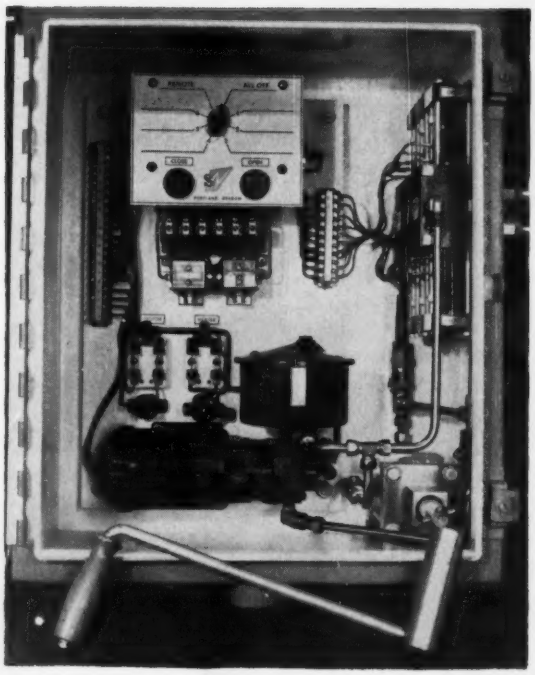
Foster Wheeler designs and builds utility, industrial and marine steam generators; pulverized fuel systems, steam condensers, feedwater heaters, nuclear components, cooling towers, pressure vessels, oil refineries; chemical, petro-chemical and industrial processing plants. Foster Wheeler Corporation, 666 Fifth Avenue, New York 19, New York.

FOSTER FW WHEELER

NEW YORK TORONTO LONDON PARIS MILAN TOKYO

New Equipment

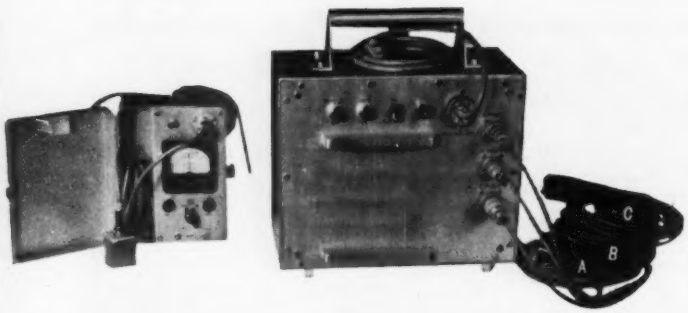
Hydraulic Switch Operator...



. . . air break, 40,000 in.-lb running torque, has adjustable speed from 1 to 5 sec full opening or closing. One standard operator is used for 15 to 345 kv switches, either reciprocating or rotating controls. Unit is designed to operate from one to six three-pole air break switches, completely independently of each other, in sequence or parallel operation. When several switches are operated in the same substation, operator cost per switch is said to be less than 50% of the cost of conventional motor operators. In case of electrical failure, manual means are provided for rapid operation of the switch. The hydraulic operator does not use stored energy and there is no pressure in the hydraulic system except during actual switch operation. A universal ac-dc motor for 120 v and 250 v is utilized by the operator; dc motors are available for 48 v, 24 v and 12 v.

Schwager-Wood Co, Inc, Portand 19, Ore.

Impulse Phase-Identifier . . .



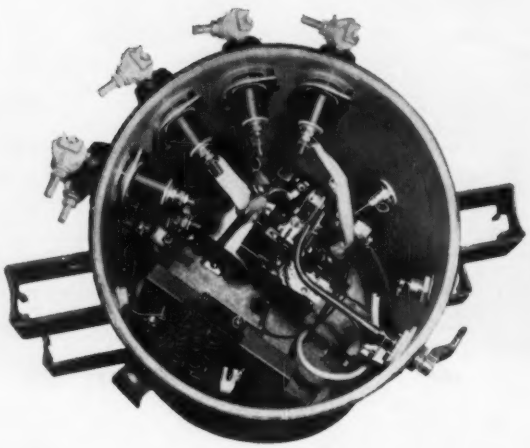
. . . eliminates need for spearing cables, disconnecting transformers or disturbing cable sheath or covering. Model XPT-100 cable and phase identifier transmitter consists of a capacitor discharge transmitter and battery-operated, transistorized detector and may be used for identifying single or two-conductor cables, as well as three-phase control cables. Pulses are generated by discharge of a 30 mfd capacitor charged to 1,700 dc, controlled by an electronic (non-mechanical) tube. A motor-driven, synchronous switch controls pulse repetition rate.

Duncan Electric Co, Inc, Chicago, Ill.

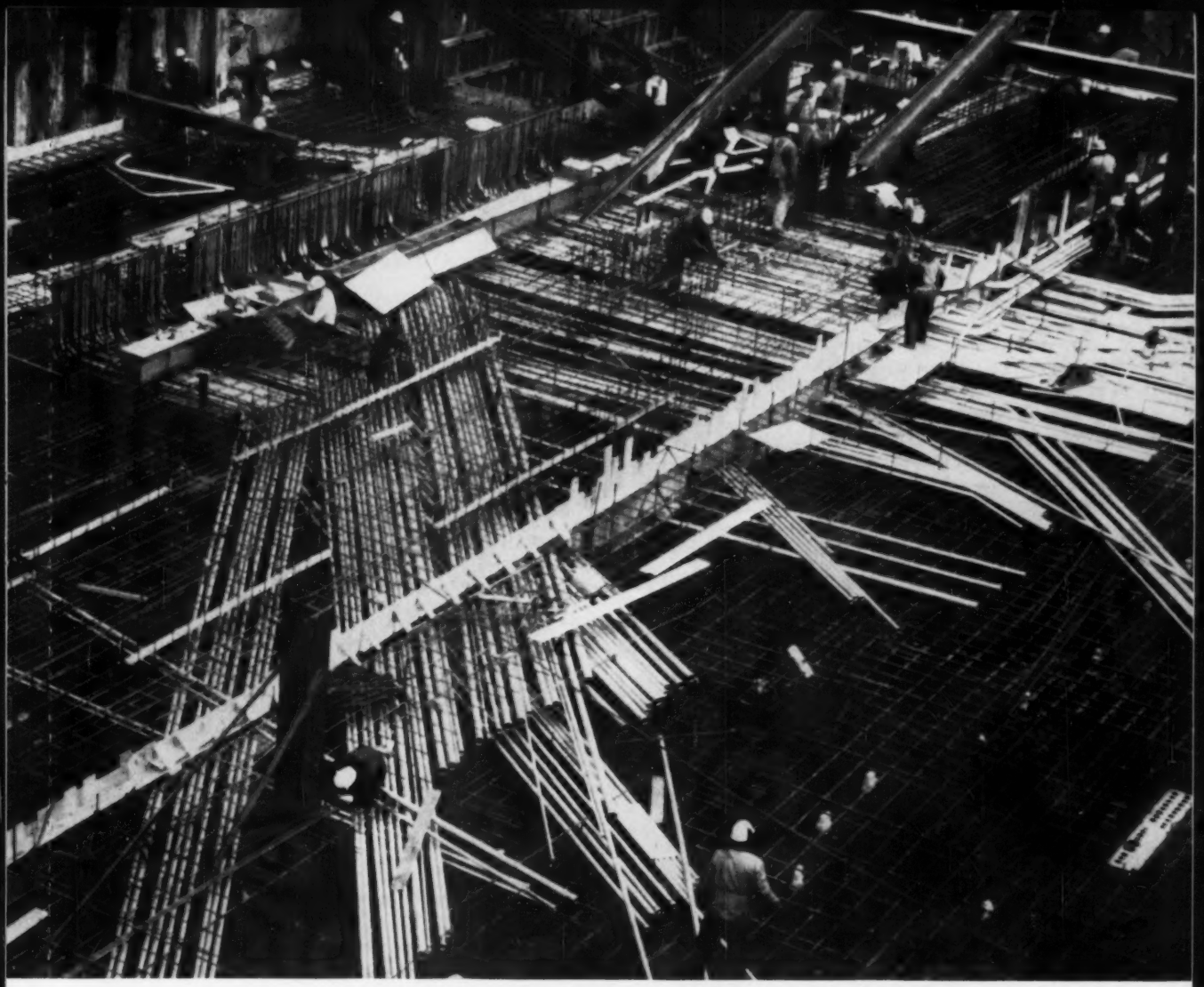
Distribution Transformers . . .

. . . have separate 240-v circuit for operating well pumps in case of fire. The Vigilante is a 10-kva, 7,200/12,470Y to 240/120-v unit for rural lines, with a conventional core-and-coil assembly protected by a secondary circuit breaker with external operating handle. Service to the house, barns and other buildings is supplied through the breaker and can be cut off if necessary. The separate circuit for the pump, which remains operative as long as the power supply to the transformer is not interrupted, is taken off ahead of the breaker and brought out to two additional low-voltage bushings through a current transformer used for metering. The current transformer is mounted inside the tank.

Wagner Electric Corp, St Louis 14, Mo.



(*More New Equipment on page* 70)



This industrial building depends on structural steel for its rugged frame, and on steel conduit to minimize the hazard of an electrical fire when the building is completed.

INSTALL SAFETY... specify Rigid Steel Conduit

Steel conduit assures real protection against the hazards inherent in any electrical wiring system. *It's strong.* Steel conduit can withstand mechanical damage both during and after installation. *It's durable, too.* It does its job well with a minimum of maintenance for the natural life of the building. *Steel conduit is fully compatible with most building materials.* It gives full grounding protection, and tends to confine short-circuit fires to within the conduit itself.

There's Safety in Steel

For over 50 years rigid steel conduit has provided dependable protection for wiring. *And it still does.* Ask your electrical distributor for comparative details. Or check with leading manufacturers of steel electrical conduit, many of whom build their products from Bethlehem steel—EMT from Bethlehem steel sheet; rigid conduit from Bethlehem steel pipe.

Steel

For Strength . . . Economy . . . Versatility

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Sales: Bethlehem Steel Export Corporation

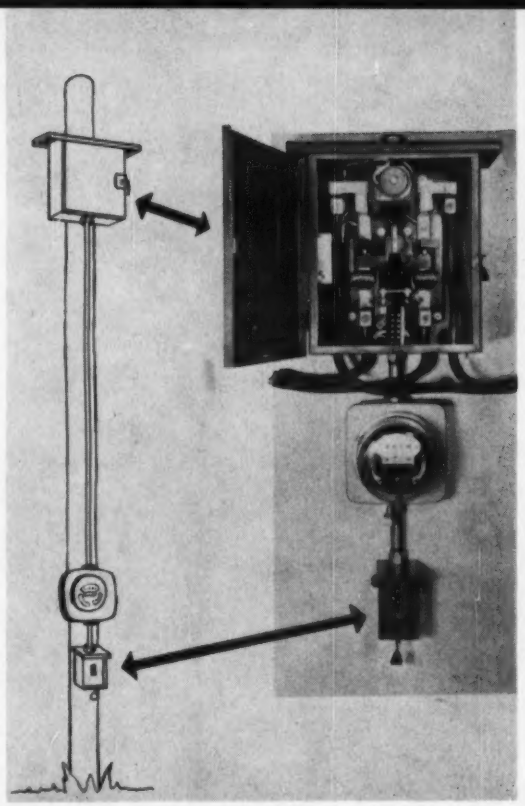
BETHLEHEM STEEL

BETHLEHEM STEEL

Pole-Top Metering Switch . . .

. . . is a permanent means of increasing customer service or installing new service up to 400 amp. Control breaker is mounted permanently directly below the meter so that service may be quickly disconnected. The Meter-Rite special current transformer is said to permit metering accuracy equal to that of a meter loop using standard current transformer and special low-amperage meter. Cold load pick-up protection reportedly reduces problems after power failures. A thermal time-delay switch mounted in the weather-tight assembly box protects the electrical system during power outages or failure. Unit permits old meter to be used when increasing customer power service. In case of short circuits or when power demand becomes excessive, the breaker disconnects automatically.

System Analyzer Corp, Nokomis, Ill.



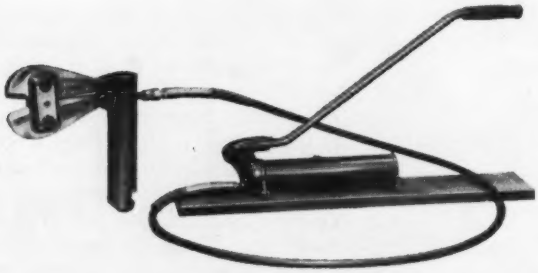
Radiation Survey Meter . . .

. . . doubles as a plant and/or field survey unit. In the 0 to 50 milliroentgen-per-hr range, the portable, transistorized alpha-beta-gamma meter—Anton 701—is powered by five conventional 1.5-v flashlight batteries. Power supply is regulated by a corona discharge VR tube. No warm-up is required and the instrument will operate continuously for 100 hr without need for recalibration or battery charge. Ranges are: 0 to 0.5, 0 to 5 and 0 to 50 mr/hr; 300, 3,000, and 30,000 CPM.

Anton Laboratories, Inc, Brooklyn 37, N. Y.

Hydraulic Cutter . . .

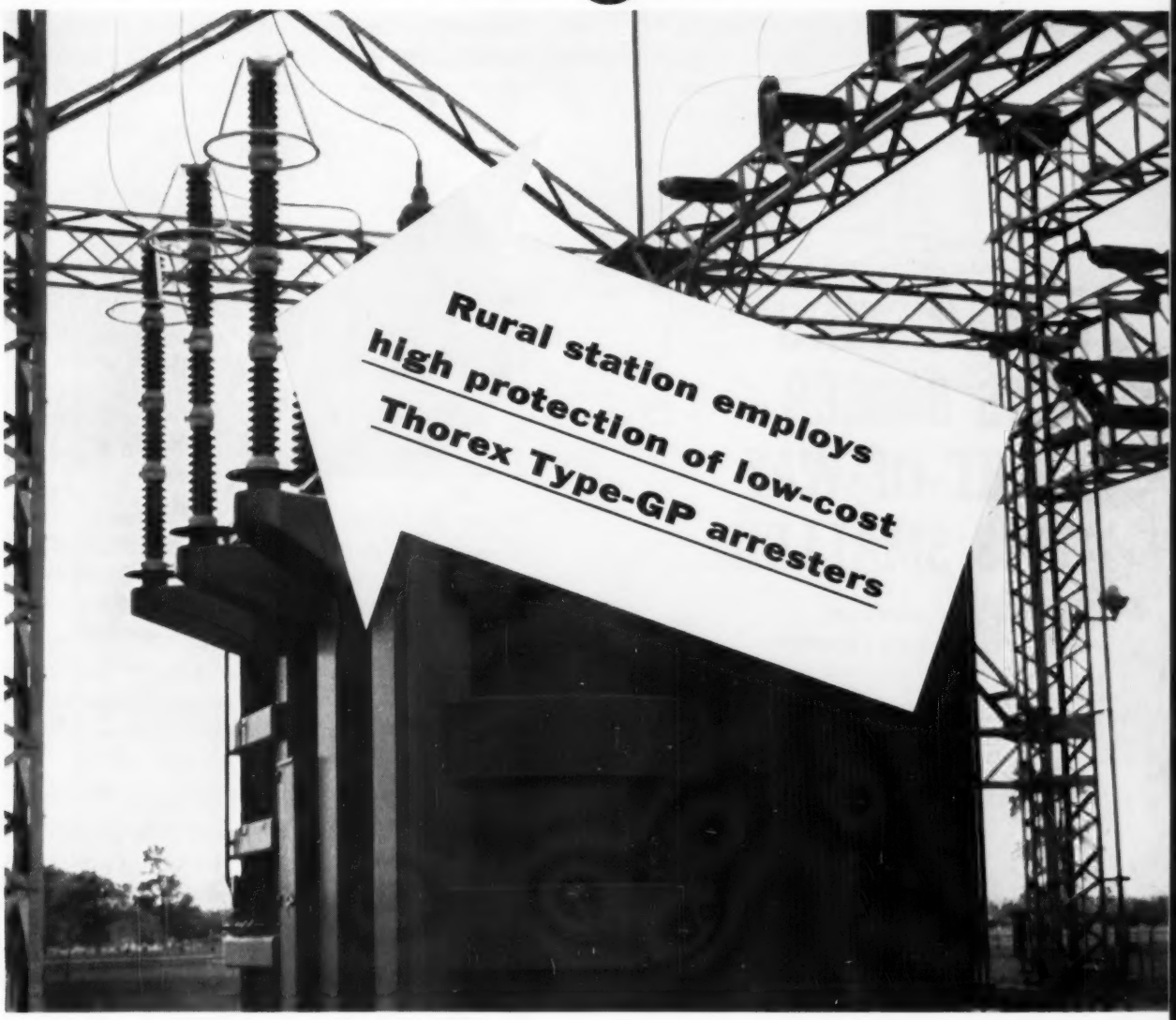
. . . cuts soft metals through ¾-in. dia and medium-hard metals through ⅝-in. dia, e.g., brass, copper, aluminum, steel, iron, plastics, etc. Model 179OCD hand-hydraulic cutter combines a heavy-duty Porter center-cut cutter head with hydraulic power. The cutters are powered by fast-acting, remote-control, hand-hydraulic pumps which force hydraulic fluid through high-pressure hose to the ram assembly and deliver 25,000-psi pressure on the cutting edges of the blades. Damage from overloading is said to be assured by the design. Cutting blades are drop-forged and induction-hardened for longer, more efficient service, and the cutting edge is placed in the middle of the blade to increase its strength. Other new hand-hydraulic cutters available are: 179OTN,



a notched shear cutter for cutting soft and medium-hard coarse, stranded guy wire, wire rope and cable up to ¾-in. dia; also two models of shear type cable cutter for cutting copper and aluminum communication cable up to 3-in. dia.

H. K. Porter, Inc, Somerville 43, Mass.

Proves intelligent choice



Thorex Type GP-121 Intermediate Class lightning arresters give this 138-kv transformer the exact type of protection needed. The owners want dependable service from this station for several scattered communities and manufacturing plants. Its district encounters an average of 37.5 annual storm days and as high as 64 days requiring high protection.

The station was built in a rural area where load conditions and air-borne contamination did not justify more elaborate arrester construction. Economic considerations for the station dictated a low budget. Thorex Intermediate Class proved to be an intelligent choice of arresters.

These Thorex Type GP arresters give more margin of protection because they employ Dynagap - - the unique current limiting gap that extinguishes the follow-current arc before current-zero. Dynagap provides low sparkover values and the lowest IR discharge voltage of the Industry's Intermediate Class.

Dynagap also permits arrester characteristics that exceed, by a large margin, the low-current, long-duration durability requirements of even Station Class arresters.

Thorex Intermediate Class has the protection and ruggedness that this station needs, yet costs about half that of Station Class arresters. Thorex Type GP arresters offer you more protective margin for each arrester dollar than any other arrester.

OHIO BRASS COMPANY, MANSFIELD, OHIO

Ohio Brass HOLAN

PORCELAIN INSULATORS • LINE HARDWARE • CAPACITORS • LIGHTNING ARRESTERS
BUSHINGS • HOLAN TRUCK-MOUNTED POWER DEVICES AND BODIES • BRONZE VALVES

10117-H

OHIO BRASS MANAGEMENT REPORT

AS THINKING GETS BIGGER, RIGHT-OF-WAY GETS SMALLER

BY GEORGE L. DRAFFAN
CHAIRMAN, OHIO BRASS COMPANY

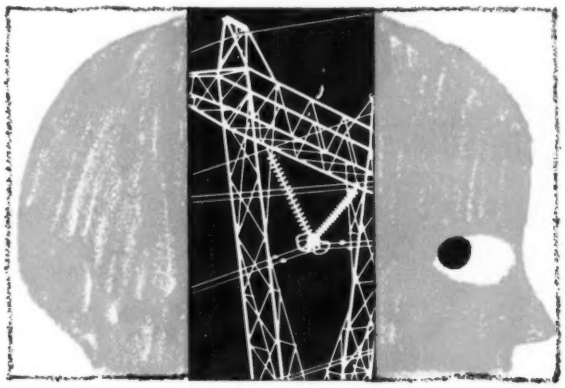
Every development engineer—the man responsible for product design—should have two signs at the top of his drawing board. One would be the usual: "Think." The other would say, "BUT THINK BIG."

NOW THAT VALUE ANALYSIS has become a popular term in practically every industrial household, it would be easy for development engineers to become overly occupied with product details.

AT OHIO BRASS we have to be especially careful to avoid preoccupation with details. For the most part, our products constitute only a small fraction of the total cost of a distribution line, transmission line, or substation. We could donate the entire cost of our products and the saving to the utility customer would be only two or three per cent.

OUR GREAT OPPORTUNITY for customer service lies in designing products or in finding new applications for present products to reduce total project costs. Let's consider some practical applications of "big thinking"—big to us at least—that extend beyond product details.

WE HAVE A GOOD EXAMPLE in the transmission field. Wade Burleson, our extra-high voltage consultant, and Bob Harmon, one of our development engineers, recently presented an AIEE



paper on "High Voltage Line Economies with V-String Insulators." I will be glad to send you the complete paper (ask for 1503-H) if you're interested in the details, but the basic idea is to use a V-string arrangement of suspension insulators to reduce structure loadings and conductor side-sway . . . important considerations where right-of-way is expensive. Right-of-way width can be reduced considerably. On a 230-kv line built on conventional H-frames, it's possible to save as much as 35 feet at mid-span.

AS RECENTLY AS FIVE YEARS AGO the protection of distribution lines and equipment with lightning arresters was somewhat questionable. But through miniaturization of components, arresters were developed which offered the same high level of protection found in substation arresters. The new style arresters actually cost a little more but the trouble they prevent leads to savings many times in excess of the extra cost.

IN A LATER REPORT, I would like to tell you about some examples in substation equipment design where thinking beyond the product has resulted in important gains for utilities. In the meantime, we're making more "BUT THINK BIG" signs for our engineers.

HOLAN

10153-H

OHIO BRASS COMPANY, MANSFIELD, OHIO

Porcelain Insulators – Line Hardware – Capacitors – Lightning Arresters
Bushings – Holan Truck-Mounted Power Devices and Bodies – Bronze Valves

Electrical World

OCTOBER 16, 1961

Management Newsletter

FPC Jurisdiction—What Does It Mean?

CONCLUSION OF A TWO-PART SERIES

Up until very recently, when its difficulties in coping with a flood of gas cases drew fire in the Landis report and Congressional subcommittee hearings, the Federal Power Commission had been spared much of the adverse publicity and controversy which seems to swirl about government agencies periodically. It has won respect as a generally fair arbiter of utility operations.

But with unprecedented speed, three of the four Commissioners holding office at the first of the year have left, and the fourth has handed in his resignation. In a little more than six months, control of the Commission has passed into the hands of Commissioners appointed by the Kennedy Administration.

In the light of these developments, it is worthwhile to see if they are likely to have any pronounced effect on the course of philosophy and action of the Commission. The extent of the Commission's power—and what can be done with it—are central to any hazy guesswork as to the Commission's course in the next few years.

The Federal Power Commission's operations in the field of interconnections and physical facilities for transmission of power in interstate commerce have three main facets.[1] The first of these might be known as the Commission's exhortation clause. The FPC is empowered and directed to divide the country into regional districts for the voluntary interconnection and coordination of facilities for the generation, transmission and sale of electric energy. And the Commission has the duty to promote and encourage interconnection and coordination within each district and between districts.

There are no enforcement provisions in this section, however. "Promote" and

"encourage" are some distance away from "order." The FPC technical staff views itself as a catalyst helping to bring to fruition logical interconnections which may have been stymied by personalities, programs or general inertia.

It has worked pretty well in the past. Some utility people are inclined to brush off the Commission's activity as unnecessary investigations of interconnection which the utilities involved had previously studied, usually at much greater length. But Commission personnel can document a persuasive case supporting their contention that a Commission study is often followed, after a time lag, with construction of an interconnection.

Expansion of this activity would require a lot more in the way of funds and personnel than the Commission now has—probably a lot more than Congress would be willing to give it. The FPC is understaffed in all departments and severely understaffed on the technical side. This seriously handicaps all studies in the electric power field.

The second "interconnection clause" has some teeth, but they haven't been used much. The Commission has the power to order interconnections between a "public utility" subject to Commission jurisdiction and another party in the power business under certain prescribed conditions.

First, it takes the complaint of a state commission or "any person engaged in the transmission or sale of electric energy" to initiate the process. The Commission must find that an interconnection is necessary or appropriate in the public interest. But it can't compel the enlargement of generating facilities, nor can it compel the utility to sell or exchange energy when to do so would impair its ability to render adequate service to its customers.

It isn't likely that a state commission would complain to the FPC to force an interconnection. Most state commissions worry too much about the FPC's usurping their prerogatives to run for FPC help when they want something done. And state commissions tend to be more interested in local thermal plants than in further interconnections.

Investor-owned utilities would rather work out their own power supply problems without the assistance of the Commission. Rural electric cooperatives could initiate some action of this type, but most—and Administration policy appears to back them up—would rather build thermal plants themselves than request additional interconnections with investor-owned utilities. This leaves municipal systems as the most likely source of requests of this nature. And the number of actual situations where a request would be valid is not very large. But the Commission does have this source of power to force interconnections.

The Commission has extremely wide emergency powers. It has the authority during an emergency to require by order such temporary connections or facilities and such generation, delivery, interchange or transmission of electric energy as in its judgment will best meet the emergency and serve the public interest.

The extent of the emergency and the determination of when it exists is left largely to the discretion of the Commission. The wording of the clause includes war, a sudden increase in demand or a sudden shortage of facilities or of fuel or water, and "other causes." The Commission's use of these provisions has been circumspect in the past, and Congressional displeasure would be almost certainly forthcoming if the power were abused.

The Commission's accounting rulings have carried plenty of weight since the Supreme Court held in *Federal Power Commission v. Pacific Power and Light Co*[8] that the Court must not get involved in processes which are discretionary with the Commission. And later, in *Northwestern Electric Co v. FPC*[9], Justice Roberts,

speaking for the Court, said, "The method adopted by the Federal Power Commission for disposition of a write-up supported by expert evidence and not plainly arbitrary may not be set aside, even though it may not accord with the best accounting practice."

So efforts to upset FPC accounting decisions, at least in the realm of what to place in what account, seem doomed to failure. This is important in view of the historical trend of some state commission to follow—albeit grudgingly in many cases—the lead of the FPC. In ratemaking, this has been borne out by the difficulties involved in persuading state commissions to adopt the "fair value" standard instead of FPC's "original cost" theory.

In periods of rising costs the original cost provision causes utilities, so they maintain, to pay a portion of their dividends out of capital, because the reproduction cost of plant already on utility books keeps rising. The FPC's position is that there is no point in trending original cost on items of plant that no one would reproduce anyway. The FPC does not believe in speculation about cost at all. Replacement facilities would have improvements in efficiency to allow reproductions from operating cost. However, the FPC is aware that inflationary periods are hard on original cost accounting, and that its position confines utilities. It is extremely unlikely that the Commission will change its thinking in this respect, but it could alleviate the situation by permitting increases in rate of return. And it will be watched closely by state commissions to see which way it jumps—if it jumps.

On the other side of the coin, the FPC has gone on record as favoring normalization of tax reductions due to use of liberalized depreciation. The Commission has been willing to split the difference of the improvement in apparent earnings between stockholders and ratepayers. But this position has had less time to harden into a historical pillar of FPC principle, and it too must be watched as a barometer of Commission thinking.

Of current importance is the question of the extent of FPC control over accounts, above and beyond the requirement of keeping a set of "FPC books" in addition to those required by the state commissions. The FPC is now attempting to assert jurisdiction over the accounting system used in the annual report of the Appalachian Power Co.[4] In this, they rely on precedents supporting the "federal primacy" theory.[5] A successful fight on this front by the Commission would affect the annual report provisions of many other utilities.

The jurisdictional issues, resolved for most utilities some time ago, are still alive in some cases. In *City of Colton, California v. Southern California Edison Co*[6] the Commission has followed a trend of encroaching more on local jurisdiction that it established some time ago. It is clear from Commission approaches to the jurisdictional question that it considers the *Connecticut Light and Power case*[7], which restricted Commission ability to determine the extent to which facilities may be considered to be in interstate commerce, no longer applicable. It is reverting to the theory of extremely wide interpretation of the word "facility" and consequent broad area of FPC authority which was enunciated in the *Hartford Electric Light Co case*[8]. This can have the effect of giving the Commission jurisdiction over a larger number of rates than was previously the case.

The licensing power of the Commission[9] affects fewer utilities, but for those affected the Commission's determinations may be much more critical. A number of licenses for hydro developments reach their 50-year expiration dates in the next few years, and there will probably be Congressional pressure, as threatened after the defeat of the Hanford generating facilities, for a "policy review" of license activity. The FPC has the authority to renew hydro power licenses, claim them for the federal government, or reissue them to different parties.

Of primary importance in assessing Commission policy is the evaluation of its moves

in the "common carrier" field. In 1952 the Supreme Court ruled[10] that the Commission had the authority to impose limited common carrier conditions upon transmission lines which were part of a licensed project and which cross public lands. There are, though, many other points at which a common carrier philosophy could make its presence known.

Justice Douglas, in the Idaho Power Case, wrote: "Protection of the public domain, conservation of water power resources, development of comprehensive plans for the waterways—each of these might on the facts of a case be sufficient to authorize the grant of permission to a public utility company to use the public domain provided it agreed to use its excess capacity to transmit government power." This opinion could, perhaps, be expanded to include new construction of lines passing over the federal lands and in interstate commerce even when not connected with a license application. It could prove a test of Commission thinking.

River basin study is an area the FPC would like to study more heavily. The Commission wants to act as a bridge between investor-owned utilities and some of the more militant arms of federal power policy in developing thorough plans for the nation's major river basins. However, its shortage of funds for technical studies will handicap it in this respect also.

In addition to existing license renewals, the Commission will be required to rule on new license applications. The outstanding one on the fire at present is the seemingly interminable High Mountain Sheep-Nez Perce fight on who should build what dam at what point on the Snake River. The outcome of the High Mountain Sheep site dispute may well indicate how public vs. investor-owned license applications will fare at the hands of the new Commission. And this would have effects on sections of the country other than the Pacific Northwest.

Section 10(f) of the Federal Power Act[11] gives the Commission power to assess charges against any licensee or permittee operating a dam who is benefited by construction of other facilities upstream or downstream, plus assessment of the costs incurred by the Commission in making the study. Because of the omission of binding language in the Act, the FPC cannot assess any federal facilities for benefits received as a result of non-federal construction. The Commission has attempted to introduce legislation which would make the federal dams subject to the same rules as the non-federal dams, but Congress shows no sign of listening.

There is no reason to expect a sudden shift in FPC policy. The Commission has maintained good relations with the industry it regulates for what is, by Washington standards, an exceptional period of time. Company personnel who have to do business with the Commission have great respect for the thoroughness and competence with which the staff goes into various problems. Such respect has been demonstrated by the willingness of investor-owned utilities to hire top men away from the Commission.

The Commission's court experience has been near-perfect. Only occasionally has it been possible to upset a Commission decision, a result of the thought and care which have gone into the Commission's work. This thought and care is an asset for the investor-owned industry as well as the Commission.

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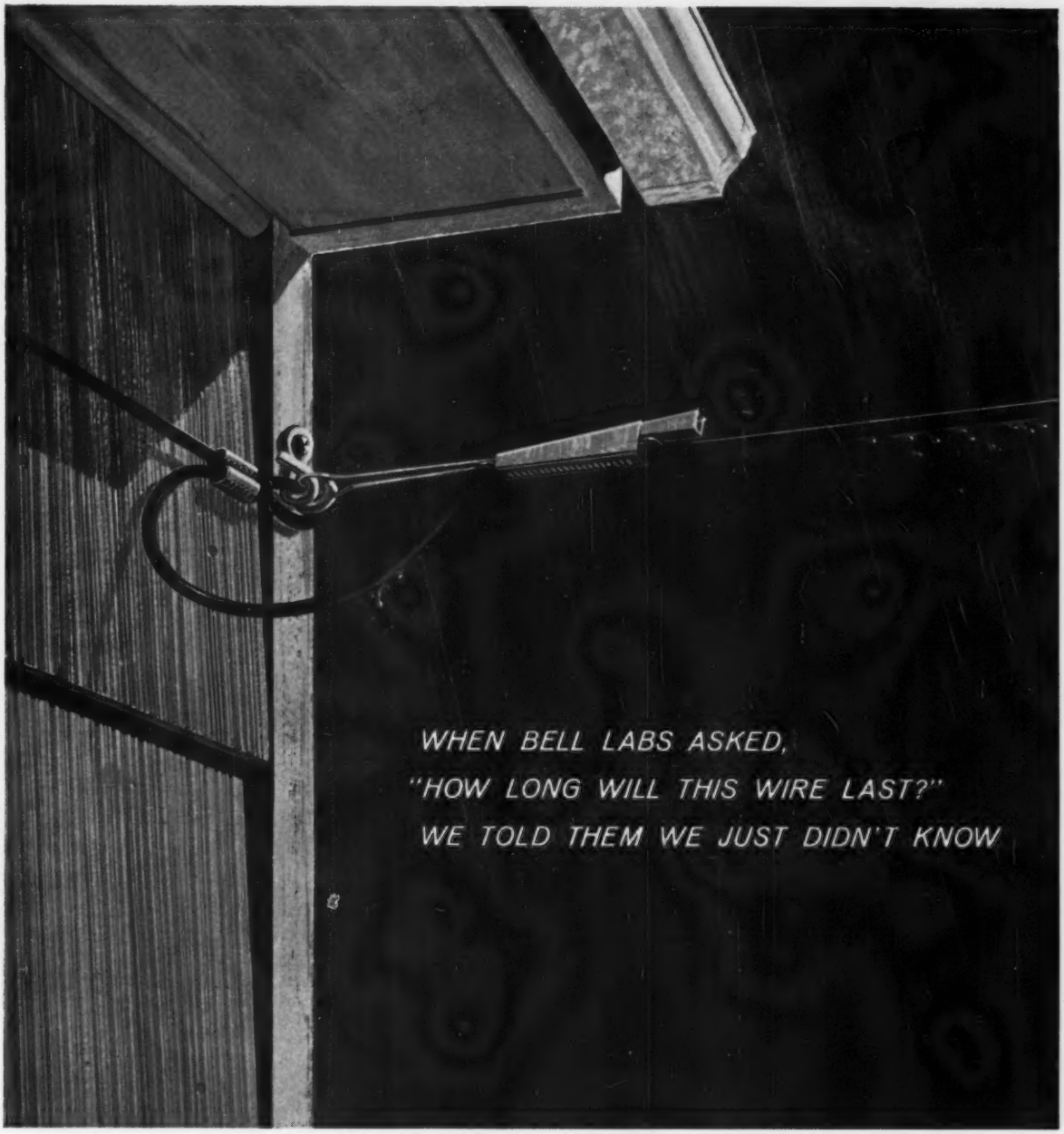
[1]49 Stat. 863, 16 U.S.C. §824a (1958).
[2]307 U.S. 156 (1939).
[3]321 U.S. 119 (1944).
[4]FPC, Docket No. E-6900 §E-6918.
[5]Northwestern Electric Co v. FPC, supra, and Arkansas Power and Light Co v. FPC, 185 F.2d 751 (1950).
[6]FPC, Docket No. E-6821.
[7]324 U.S. 515 (1945).
[8]131 F.2d 953 (1942), cert. denied, 319 U.S. 61 (1943).
[9]16 U.S.C. §791a-823, 41 Stat. 1067 (1958).
[10]FPC v. Idaho Power Co, 344 U.S. 17 (1952).
[11]16 U.S.C. §803, 41 Stat. 1068 (1958).



And 19 years later—we still don't! Since 1942, over 8 billion feet of neoprene covered telephone drop wire has gone into pole-to-home service throughout the country. Some of it will soon mark its 20th anniversary, with the neoprene in such good condition that its ultimate life is still a question.

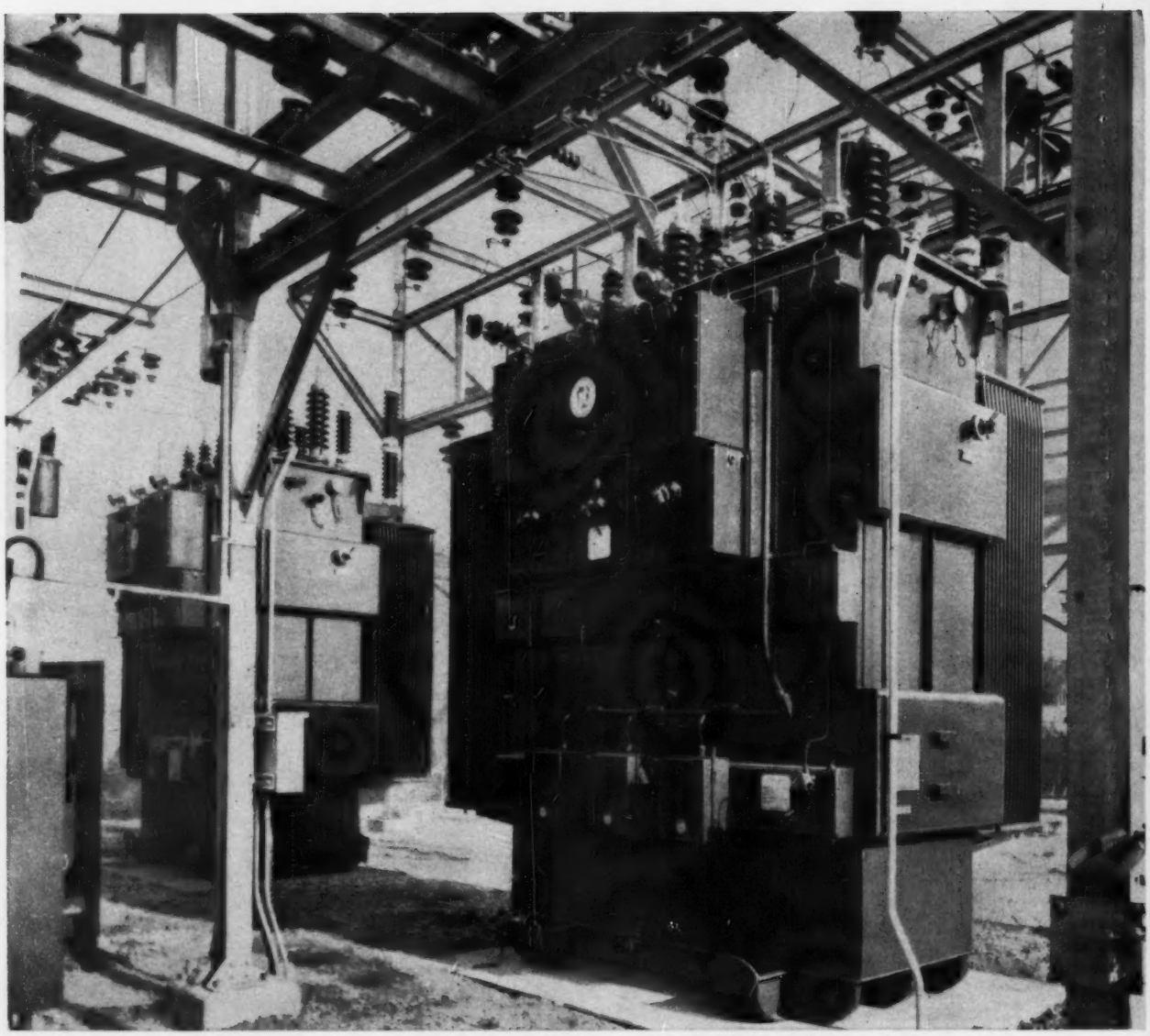
Recently, as part of a test program, Bell Laboratories cut down a piece of this drop wire which had seen outdoor service in Los Angeles since 1946. Exhaustive testing proved the neoprene covering virtually as good as the day it came off the reel. Tough as a tendon. Supple as muscle. Practically unblemished by the unending assaults of sun, ozone, airborne chemicals, high and low temperatures. Elongation of the 15-year-old sample measured at 130%, tensile at 1905 psi (more than 70% of the original psi)!

Neoprene synthetic rubber offers this kind of long-term reliability to wire and cable of all types. For information, write E. I. du Pont de Nemours & Co. (Inc.), Elastomer Chemicals Department EW-10, Wilmington 98, Delaware.

DU PONT REG. U. S. PAT. OFF.

NEOPRENE
SYNTHETIC RUBBER

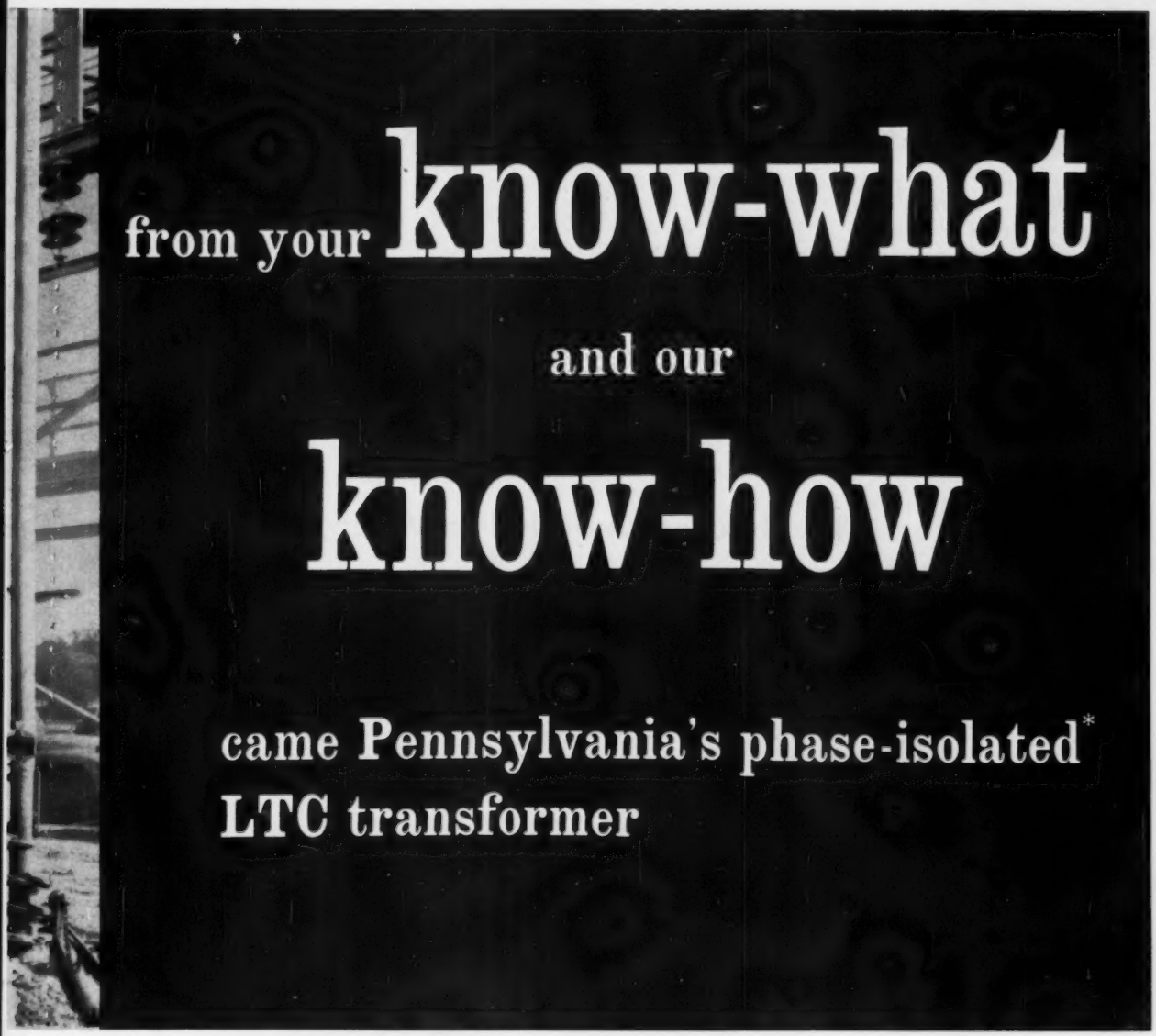
Better Things for Better Living . . . *through Chemistry*



Phase-Isolated LTC transformers rated 7500 kva, 67000△-13090Y/7560 volts with 20% regulation in 32 full-capacity steps-16 above and 16 below. The units have provision for future FA cooling to increase the rating to 9375 kva and are equipped for parallel operation.

Pennsylvania Phase-Isolated Three-Phase Transformers with range of 20% regulation in 32 steps are available in the following kva and voltage ratings:		
BIL	**LOW VOLTAGE**	**KVA**
75 kv	4160Y/2400 or 4360Y/2520 volts	1000 kva thru 2500/3125 kva incl.
95 kv	8320Y/4800 or 8720Y/5040 volts	1000 kva thru 5000/6250 kva incl.
110 kv	12470Y/7200 or 13090Y/7560 or 13200Y/7620 or 13800Y/7980 volts	1000 kva thru 7500/9375 kva incl.
Note: Other voltage and kva ratings can be secured under special conditions.		

PENNSYLVANIA PHASE-ISOLATED



from your know-what

and our

know-how

came Pennsylvania's phase-isolated* LTC transformer

From a broad survey, made among utility engineers and operating people, we found that two worthwhile features were lacking from conventional 3-phase LTC transformers used for supplying distribution system loads. Independent single-phase regulation was one, and by-pass facilities for the LTC switches and mechanisms was the other.

Single-Phase Regulation

With single-phase regulation of 3-phase transformers, voltage extremes can be held to narrower limits. Consequently, feeder loading can be increased without exceeding established voltage limits. This appreciably reduces expenditures for expansion. When voltage limits are reduced, the average voltage can be increased, producing substantially more revenue from voltage-sensitive loads.

LTC By-pass Switches

Conventional 3-phase LTC transformers must be entirely de-energized in order to inspect or maintain the contacts and mechanism. Integral by-pass facilities permit this equipment to be safely serviced phase-by-phase, without de-energizing the circuit. The work can be done according to a convenient schedule, at a lower cost.

Pennsylvania has incorporated these valuable features in the Phase-Isolated LTC transformer. The cost? . . . only slightly more than for an equivalent conventional LTC transformer. Compared with the installation of separate units—transformers, regulators and by-pass switches—the cost is considerably less.

When planning your next distribution substation addition, consider the advantages of a Pennsylvania Phase-Isolated LTC Transformer. Bulletin #591, containing further information, will be supplied on request. Write on your company letterhead to Power Sales Department, Pennsylvania Transformer Division, McGraw-Edison Company, Canonsburg, Pennsylvania.

McGRAW EDISON

*Patent pending

THREE-PHASE TRANSFORMERS

McElwain Steps Into Presidency

McELWAIN ▶

Jersey Central and New Jersey Power & Light Companies have elected William H. McElwain president. He succeeds Charles E. Kohlhepp who will retire.

McElwain began his utility career in 1926 with New York State Electric & Gas Co p. He served in various capacities until 1949, when he moved to Metropolitan Edison Co as superintendent of operations. In 1950 he became vice president of Met Ed's western division, headquartered in York, Pa. The following year he took charge of operations.

He came to the New Jersey utilities in 1956 as a director and vice president-engineering and operations. He has been executive vice president of the two companies for three years.

Central Hudson G&E Chooses Underhill as VP-Engineering

UNDERHILL ▶

Central Hudson Gas & Electric Corp has promoted George H. Underhill to vice president-engineering. He succeeded George H. Landis who retired after 39 years with the utility.

Underhill joined Central Hudson in 1920 as a junior electrical engineer. He became superintendent of electric distribution in 1932, and was named assistant to the chief engineer two years later. While serving as deputy chief engineer, he also acted as manager of the engineering department's planning division from 1955 until earlier this year.

Florida Utility Selects Ellis to Become Vice President

Robert F. Ellis Jr has been promoted to vice president of Gulf Power Co.

He joined Gulf Power in 1946 as an engineer in the operating department. In 1955 Ellis was appointed planning engineer. He has been assistant to the general manager for the past three years.

◀ ELLIS

G&W Electric Specialty Picks Bitzer as VP-Marketing

BITZER ▶

C. Edward Bitzer has been named vice president-marketing for G&W Electric Specialty Co. He will be responsible for expanding and coordinating the marketing, sales, and advertising functions.

Bitzer comes to G&W from Anderson Electric Corp, where he was vice president-sales. Before that, he was associated with the domestic and international divisions of Westinghouse Electric Corp in merchandising positions.

(*More News About People on page* 84)

MODULAR DESIGN OUTDOOR SUBSTATIONS MEET YOUR NEEDS QUICKLY AND ECONOMICALLY

Versatile, pre-designed structure components are the key to Westinghouse modular design outdoor substations. You simply furnish a station one-line diagram, arranged to indicate relative location of major apparatus and direction of supply lines and feeders — and let experienced Westinghouse substation designers do the rest.

Under the Westinghouse modular plan, you get:

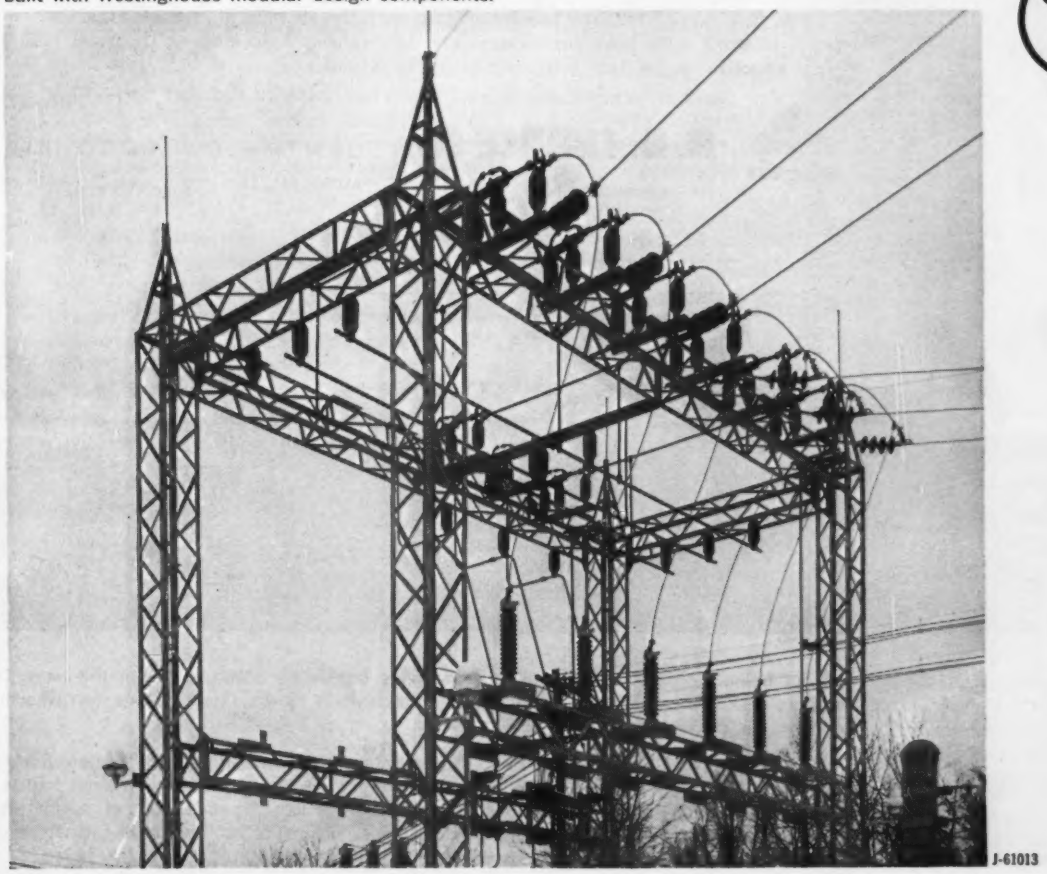
- *Tailored Station Design*. . perfectly suited to virtually any layout, using pre-designed components.
- *Economy in Steel*. . maximum strength-to-weight ratio, through proper component selection.
- *Easy Field Erection*. . through use of interchangeable members, which eliminates shop errors and permits rapid assembly.
- *Superior Product Integration*. . through single-manufacturer responsibility.
- *Simplified Planning and Fast Delivery*. . from single-line diagram to shipment of the ready-to-erect substation, this modular technique requires minimum time.

Let Westinghouse design and coordinate your outdoor substation under the modular plan. For complete information, call your Westinghouse representative or write Westinghouse Electric Corp., P.O. Box 868, Pittsburgh 30, Pa.

You can be sure . . . if it's Westinghouse

Westinghouse

Pennsylvania Electric Company's West Sayre substation shown here is a good example of a substation planned and built with Westinghouse modular design components.



J-61013

NEW Techniques and NEW Equipment make line maintenance SAFER, SIMPLER, MORE PRODUCTIVE

By O. G. "Andy" Anderson, Product Manager

Men responsible for power line construction and maintenance are constantly looking for greater SAFETY, SIMPLICITY and PRODUCTIVITY.

The development of insulated booms and platforms or buckets provides a new method of reaching these objectives.

In studying the possibilities for this new aid to maintenance work and at the same time keeping Safety in mind as we have always done in developing hot line maintenance methods, we have reached this definite conclusion. Where insulated platforms can be maneuvered into position, the safest practice is to combine them with insulated tools. That's why Chance demonstrators, who have accumulated years of service with the elite of the pole climbing fraternity, join the "bucket brigade" when the job justifies the means . . . as when they combined hot line tools and power tools with insulated booms and buckets for the switch installation shown above, at right.

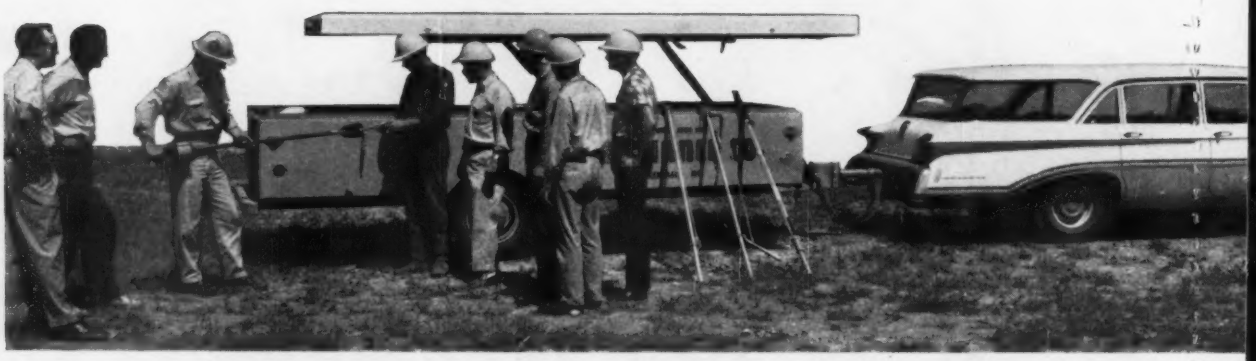
This method allows hot line maintenance crews to work with only one set of safety rules. There is no need to decide which safety rules to follow and crews are not confronted with the risk and confusion of alternating the long standing habit of working at ground potential with an entirely new procedure of working at line potential.

The A. B. Chance Company has teamed up with the Pitman Manufacturing Company, to work with your supervisors and line crews in developing the most efficient procedures for this combination of tools and equipment.

A. B. CHANCE CO. CENTRALIA, MISSOURI

A. B. Chance Co. of Canada, Ltd., Toronto

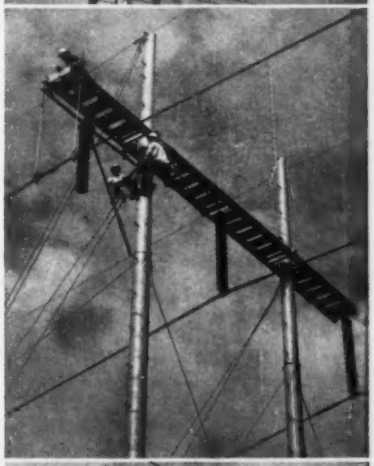
CH61-25

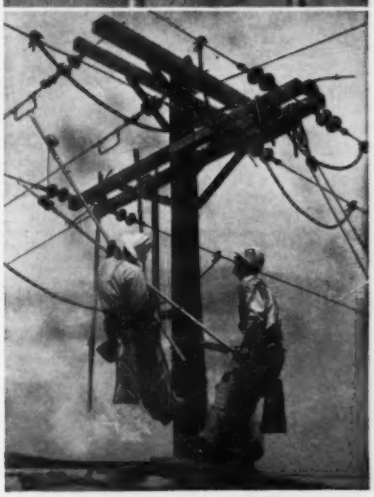


Chance **demonstrators have the job of helping Chance customers** get the highest productivity from their line crews with the greatest simplicity and safety. They, too, continually look for, and help develop better, easier, safer ways to do the many and varied jobs of line maintenance men.

As linemen, with the responsibility of demonstrating new methods to line crews, they never forget the most important word in their vocabulary . . . SAFETY. In their search for better and more productive advances in hot line work, they give first consideration to the safety of the men who must do the work.

Here, demonstrator Don Collins shows a midwestern line crew how to use the new Chance power compression tool. Line crews and their supervisors learn dozens of special techniques from these demonstrators. The entire Chance demonstrator "team" is shown at right.





INSULATED BOOM AND BUCKET USED WITH INSULATED TOOLS. A good example of this combination is shown above where hot sticks were attached to the pole to support a jumper, while insulated power tools and hand tools were used from an insulated bucket to "cut-in" a three-phase switch. This job was completed in record time without service interruption and without climbing the pole.

HOT STICK HANDLING OF BUNDLED CONDUCTOR. In the photo at top right, demonstrators and utility personnel use specially designed Chance Hot Sticks for handling energized bundled conductors while changing insulator strings on a 460 KV system. This method of insulator replacement has proved highly successful.

HOT STICK TROLLEY DEMONSTRATED. Another job simplification is shown in photo, middle right, where a Chance developed Hot Stick Trolley is used to transfer insulators for replacement on guyed steel H frame structure. This same technique is used on towers or wood H frames to bring insulator strings to an easily accessible position for making unit replacements.

PHASE TESTING DEVICE. A new Chance phasing tester is used, lower photo at right, to demonstrate how to determine correct phasing relationships before joining two circuits together.

Regardless of whether the job can be done from the pole or from an insulated platform, Chance Epoxiglas (glass reinforced resin) tools and insulated power tools help to make hot line maintenance work Safer, Simpler and More Productive.

Don Collins
Centralia, Mo.

Bob Bond
Roy, Utah

Bob Boehmer
Wheaton, Illinois

Bill Shreve
Burlington, N. J.

"Cliff" Bosch
Birmingham, Ala.

Vern Moody
Dallas, Texas

Checklist of helpful McGRAW-HILL BOOKS

AMERICAN ELECTRICIAN'S HANDBOOK

Just Out—8th Ed. Fast, accurate, day-in-day-out assistance in solving everyday electrical problems—that's what this well-known handbook—entirely revised, improved, and enlarged in accordance with National Electric Code rules—offers you *now more than ever before!* **By T. Croft. Revised by C. C. Carr. 1705 pp., 2112 illus. and tables, $17.50**

ELECTRICAL CONTRACTING

Just Out. Here are vital facts—for both the newcomer and the old hand in the electrical contracting field. Gives tips, pointers, and suggestions on gaining lucrative contracts, and many other important topics. **By R. Ashley, Estimating Consultant. 287 pp., 91 illus., $10.00**

ENGINEERING FUNDAMENTALS FOR P. E. EXAMINATIONS

Just Out. Contains essential information on the engineering basics needed to pass P. E. license examinations. Covers mathematics, mechanics of materials, electricity and electronics, chemistry, and engineering economics. **By L. M. Polentz, Consult. Engr. 394 pp., 554 illus. $9.50**

ELECTRIC MACHINERY

Just Out—2nd Ed. A thorough treatment of electric machines—how they work—their principal operating characteristics—their analysis—and uses under different conditions. Covers the theory, construction, operation, and performance analysis of modern electric machines. **By A. E. Fitzgerald, and Charles Kingsley, Jr. 600 pp., illus., $10.75**

PROGRAMMING COMPUTERS FOR BUSINESS APPLICATIONS

Just Out. Provides a sound basis for programming computers geared to business applications. Offers guidance to what a programmer must do, including a series of didactic programming examples. **By Ned Chapin, Standard Research Institute. 275 pp., 91 illus., $7.50**

ELECTRONIC PACKAGING WITH RESINS

Just Out. Describes modern resin-packaging techniques developed for electrical and electronic components and systems. Important materials fully discussed include epoxies, polyesters, silicones, urethanes, and polysulfides. **By Charles A. Harper, Westinghouse Elec. Corp. 339 pp., 139 illus., 125 tables, $11.00**

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Anderson Electric Picks Classen as VP

CLASSEN

Edward F. Classen has become vice president in charge of sales for Anderson Electric Co.

He comes to Anderson Electric from Moloney Electric Co, where he had been a vice president since 1954. Prior to joining Moloney Electric in 1950, Classen was employed by Emerson Electric Co and McDonnell Aircraft Corp of St. Louis.

Larson New Vice President Of Union Carbide Nuclear

LARSON

Clarence E. Larson has been named vice president and general manager of Oak Ridge operations for Union Carbide Nuclear Co, division of Union Carbide Corp. He succeeded Clark E. Center, who continues as a vice president on special assignments. Dr Larson has been associate manager-research for Union Carbide Corp for the past two years.

Hubbard Appoints Wright As Manager of Marketing

George C. Wright has become Hubbard & Co marketing manager. With headquarters in the Chicago general offices, he will coordinate and direct marketing of poleline hardware.

Wright joined Hubbard & Co last year as southeast division sales manager.

WRIGHT

Morgan Will Manage New Westinghouse Department

D. W. R. Morgan Jr has been appointed manager of the steam system engineering department of Westinghouse Electric Corp's steam division.

MORGAN

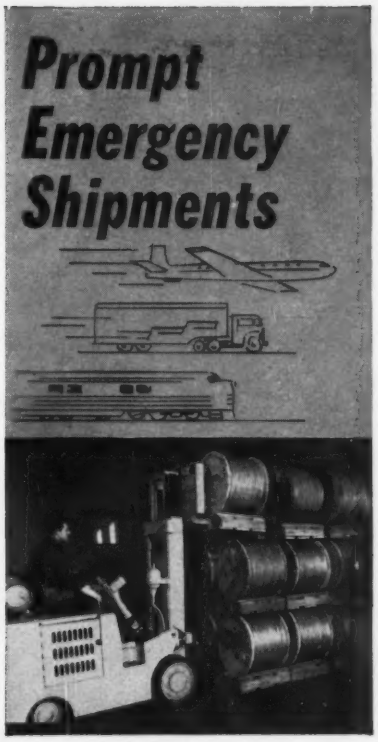
The new department will supervise the engineering selection and combination of equipment for turbine-island projects, and will assume administration of such contracts.

Erratum

CHARLES J. ELLIS

In last week's issue, a mix-up occurred in the photographs accompanying the story of Charles J. Ellis' election as General Electric Co southeastern region vice president. The person identified as Ellis was actually Carter L. Redd, who retires from the regional post in January.

Electrical World regrets the error.



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GALVANIZED
STEEL STRAND

When in need of guy or messenger strand during an emergency, be sure to contact the nearest distributor of ***Crapo*** Galvanized Strand! Substantial stocks are maintained at strategic distributing points throughout the country ready for immediate delivery. Back of these stocks are our own extensive mill stocks of finished strand, and strand in process. If your jobber does not have all of your requirements, he knows he can depend upon us for immediate shipment of popular sizes and grades by air, truck or rail.

You, in turn, can rely upon ***Crapo*** Galvanized Steel Strand, at all times, to give you the utmost in performance at reasonable cost.

Crapo Galvanized Steel Strand is manufactured in all standard sizes and grades and in three weights of coating: Class A, B and C.

Phone the distributor of *Crapo* Galvanized Steel Strand near you the next time you need strand.

INDIANA
Steel & Wire Co., Inc.
Muncie, Indiana

PERSONAL BRIEFS

In another realignment in American Electric Power Service Corp's engineering department (EW, Oct. 9, p 82), the transmission section, headed by **E. S. Zobel,** has been moved from the electrical engineering division and will report to **Carl P. Zimmerman,** recently named chief engineer who heads the engineering department.

Florida Power Corp has appointed **James L. Shoemaker** as director of public relations, succeeding the late **J. K. "Pat" Flanagan.**

Russell R. Wischmeyer has been appointed vice president in charge of construction for Pittsburgh Piping & Equipment Co.

New general sales manager for Day-Brite Lighting, Inc, of St. Louis is **George J. Kennedy.**

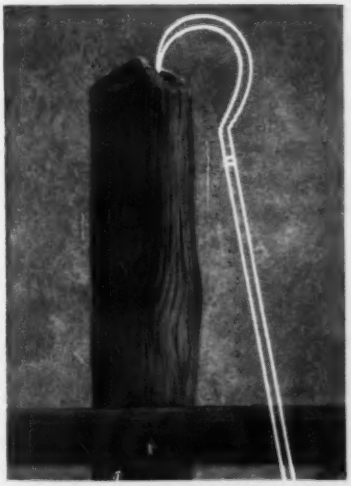
Thomas E. Stone has been named branch manager at Washington, D. C., for the commercial systems department of the Radio Corp of America's electronic data processing division.

American Hoist & Derrick Co of St. Paul, Minn., has appointed **Richard E. McCoach** to the position of manager of industrial sales.

General Electric Co has a new marketing manager for its electronic specialty capacitor product section, Irmo, S. C. **Harold Brunton Jr** succeeded **F. R. Flood** in this post. Flood became general manager of the new battery product section.

OBITUARIES . . . W. Donald Bracken, 61, vice president and general superintendent of Canadian-Niagara Power Co . . . **Sanford Miles,** 72, comptroller of Interstate Power Co when he retired three years ago . . . **Roy Taylor Blanchard,** 67, purchasing agent and traffic manager for Public Service Co of Colorado . . . **Charles L. Kenyon,** 71, former assistant treasurer of General Electric Co and manager, credit and collections services . . . **Robert R. Habberly,** executive vice president of Western Massachusetts Electric Co.

LOW COST WAY TO LEARN THE TRUE STATUS OF YOUR POLE ROOFS



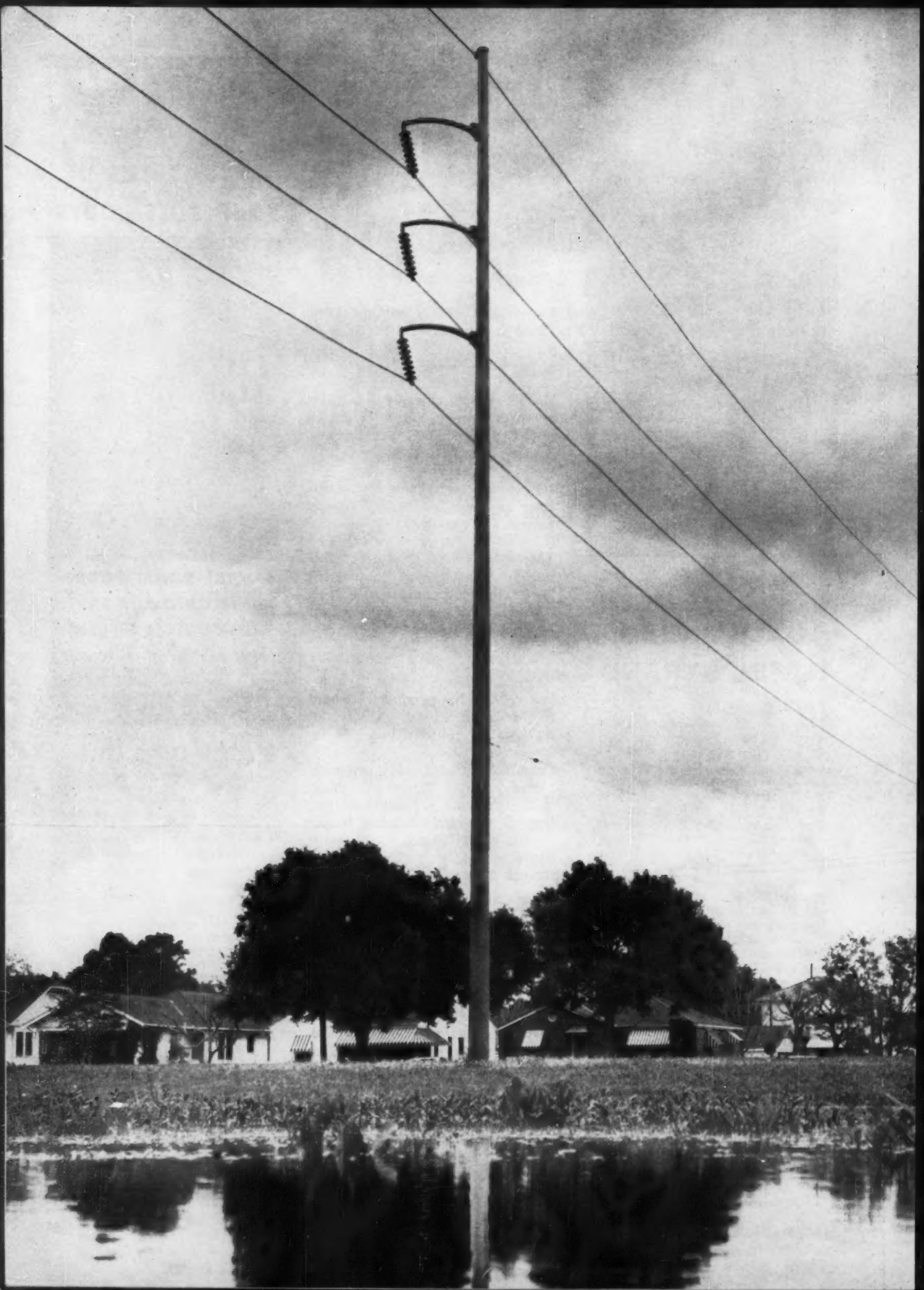
SPECIAL ROOF-PRODDER DEVELOPED FOR FAST, THOROUGH INSPECTION

Out of sight, out of mind is likely to be the case with many pole roofs. And when inspection is scheduled, "rubbering out" hot lines is a costly, time-consuming job. Now, Pole Sprayers' service features a new pole roof-prodder, a unique suggestion made by one of our good utility customers. In the hands of an experienced operator working below the crossarms, it can accurately "feel out" and measure the extent of decayed areas. As a result, the true condition of all pole roofs may be quickly determined so that corrective action may be taken if needed.

Pole Sprayers' service includes this inexpensive "inspection-plus" feature at a small additional charge. Together with POLE TOPPERS, special roof caps which may also be installed from below the crossarms, Pole Sprayers, Inc. offers the most complete in-place pole preservation service available.

For further information on how to keep your standing poles in service longer . . . write to Pole Sprayers, Inc., 991 Ellicott St., Buffalo 9, N.Y.

Pole Sprayers Inc.
SERVING UTILITIES SINCE 1935

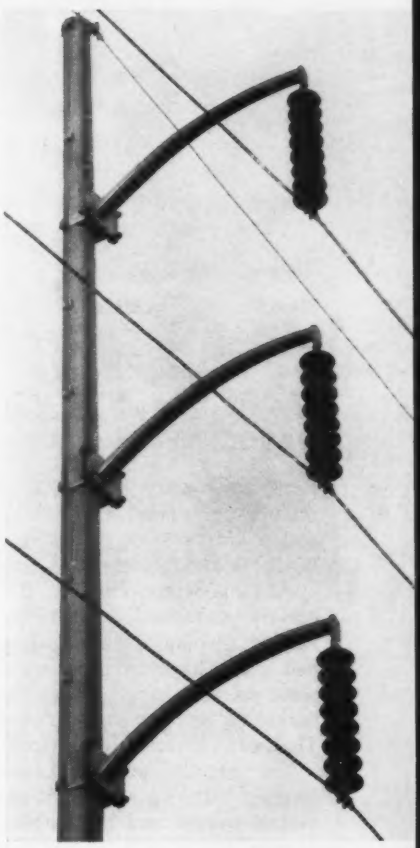


Unique 115 KV Steel Pole line solves beauty problem in New Orleans

New Orleans Public Service Inc. was faced with the problem of installing a new 115 KV transmission line through an attractive residential area. Property values were high, space was limited and appearance was an extremely important factor.

After investigating every possible type of construction, engineers reached the decision that galvanized steel poles with gracefully curved arms were the best solution. Steel was strong enough to carry the heavy loads—steel poles could be placed much farther apart—360 feet—and galvanized steel poles would blend aesthetically with their surroundings.

There are now 86 tapered round steel poles in this service. The poles were made from high-strength low-alloy steel by Union Metal of Canton, Ohio.



This mark tells you a product is made of modern, dependable Steel.

Four USS Steels for towers and substations

ASTM A7 Structural Carbon Steel galvanized for long service life. Widely used for low cost and good appearance. Minimum yield point 33,000 psi.

ASTM A36 Structural Carbon Steel. New stronger carbon steel with minimum yield point of 36,000 psi—9.1% higher than A7 structural steel. Allows increased design stress of almost 10% with significant cost savings. Also used in galvanized condition.

USS MAN-TEN High Strength Steel. 50% stronger than A7 structural carbon steel with double the atmospheric corrosion resistance. Permits weight reductions up to 33% and results in lower costs when weight savings are as low as 17%. Recommended galvanized for towers and substations. Minimum yield point 50,000 psi.

USS COR-TEN High-Strength Low-Alloy Steel 50% stronger than A7 structural carbon steel permits weight reduction with no sacrifice in strength and has 4 to 6 times the atmospheric corrosion resistance. Has a paint life twice that of carbon steel. Can be used either galvanized or *uncoated*. Recommended where corrosion is a problem to save maintenance dollars. Minimum yield point 50,000 psi.

For complete technical information on any of this family of cost-reducing steels for electrical construction, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. USS, MAN-TEN and COR-TEN are registered trademarks.

United States Steel Corporation • Columbia-Geneva Steel Division • Tennessee Coal and Iron Division • United States Steel Supply Division • United States Steel Export Company

USS United States Steel

NARUC's new officers: D. Brackman, president; E. Kreeger, secretary-treasurer; J. Brown, first vp; N. Knight, second vp; and A. Roberts, general solicitor

NARUC Meeting (*Continued from page* 31)

the opinion that the market price premium is a good indicator of the higher level of future earnings that investors are looking for.

An analyst can compute the necessary allowance in earnings for needed surplus accretion, once he had established the growth rate of some common-stock shares over a period of years, said Dr Lionel W. Thacher, University of Wisconsin.

Use of the compound interest formula will give an analyst the dividend payout and the surplus accretion and it will enable him to offset the erosion in the purchasing power of the dollar, he said.

Jesse W. Dillon, State Corporation Commission of Virginia, outlined practices for expediting commission hearings and decisions. They were:

1. Encouraging wide distribution in advance of the hearing of the company's proposed evidence and promotion of free local discussion of the proposed increase.

2. Completing the investigation and examination before the accounting division's hearing for determining the level of present earnings and the possible effect of new rates.

3. Programming the hearings of the applicant and objectors before the case starts.

4. Discouraging the filing of briefs and arguments unless unusual problems are to be presented.

5. Deciding a case promptly.

6. Requiring the parties to stick to the issues.

7. Requiring the commission's staff to cooperate with the public and give the public information regarding a company's operations.

The Missouri Public Service Commission disposed of 63.7% of its regular utility cases 90 days after filing, reported Tyre W. Burton, Missouri PSC chairman. Joseph Sharfsin explained how the Pennsylvania PUC expected to shorten utility rate hearings through a pre-hearing conference technique. This plan works as follows:

1. When a rate increase proposed by a utility has been suspended by a commission, the latter will hold a pre-hearing to clarify, simplify and systematize the utility's case on a taped record.

2. The main conference will follow within ten days, at which the issues will be defined, and stipulations and agreements concluded, and definite dates arranged.

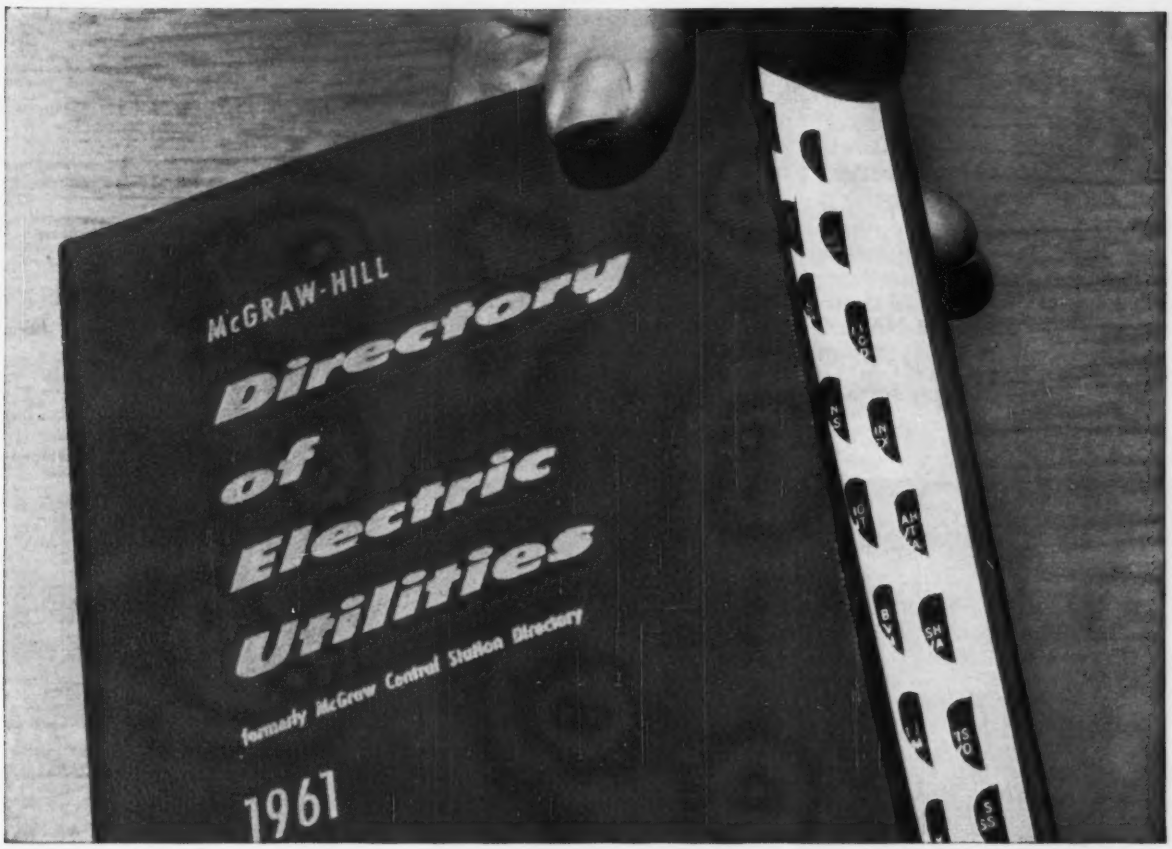
A schedule of hearing dates satisfactory to all parties made at the outset eliminates requests for postponements, a major delaying factor, Sharfsin noted. Setting new dates after each round of hearings results in attorneys finding the dates in conflict with other engagements.

Another time-saver pointed out by Sharfsin is to have the direct testimony of utility witnesses in written question-and-answer form, together with exhibits, presented to the PUC staff and the opposing parties within three weeks. Data of the complaining parties, in similar form, would be distributed ten days before the first hearing.

The testimony would be recorded as though given orally, and opposing lawyers would be allowed to file motions for striking any part deemed irrelevant.

NARUC officers appointed for 1962 are: David M. Brackman, (*Continued on page* 90)

JESSE DILLON, Virginia, tells about ways to expedite commission hearings and decisions as T. W. Burton, Missouri, and Joseph Sharfsin, Pennsylvania, listen



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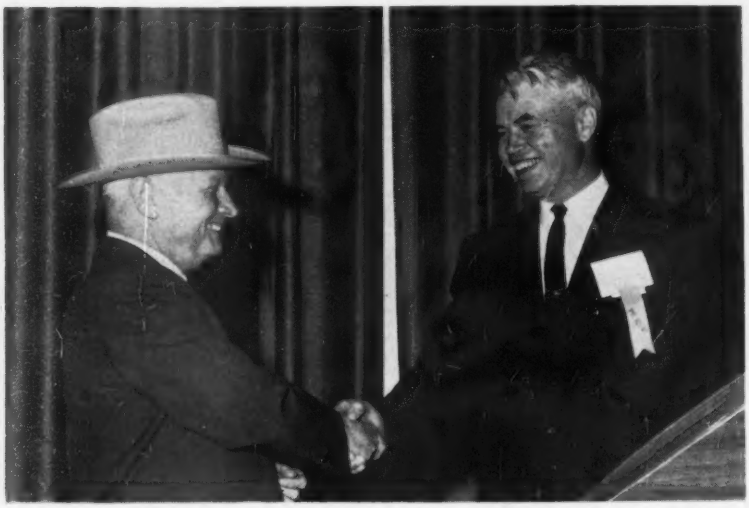
NARUC Meeting (*Continued from page* 88)

Massachusetts Department of Public Utilities, president; Joseph J. Brown, Nebraska State Railway Commission, first vice president; and, Nat B. Knight Jr, Louisiana PSC, second vice president. Austin L. Roberts, Jr, was elected general solicitor, and Everette Kreeger, assistant general solicitor and secretary-treasurer. The 1962 NARUC convention will be held at New Orleans, La., November 12-16.

A resolution favoring legislation to amend part of the Federal Power Act was presented to and passed by the convention.

The purpose of this suggested legislation would be to "exempt from Federal Power Commission jurisdiction those aspects of the transmission and sale of electric energy which are primarily of local concern and are subject to state regulation."



WALKER L. CISLER, president and board chairman, Detroit Edison Co, wears cattleman's hat presented by RMEL President P. E. Brookover for his industry role

Cisler Cited at RMEL Wyoming Meeting

Walker L. Cisler, president and board chairman, Detroit Edison Co, gave the Rocky Mountain Electrical League, holding its 58th annual convention at Jackson Lake Lodge, Wyoming, his impression of industrial development formed during his recent trip to Europe, Asia, and Africa for the Energy Advisory Council. He was honored at the meeting for his own contributions to the US electrical industry.

Charles K. Rieger, vice president, General Electric Co, urged utility executives to give more attention to sales activities and particularly to the selection of sales personnel. Analyzing prospective thermal generation additions in this country in the next ten years, M. F. Kent, also GE, predicted widespread recourse to nuclear generation.

Package boiling water reactor plants in sizes 300 to 500 Mw, he noted are being quoted at firm prices. These, he said, will generate at less than 7 mills per kwhr on the first core for an installed cost of about $180 per kw.

Warren A. Terry, Home Light & Power Co, was elected RMEL president for 1962. Vice presidents are: J. P. Roger, General Electric Co; Neil Simpson, Black Hills Power & Light Co; Veryl Hoover, Pacific Power & Light Co; and, W. D. Virtue, Public Service Co of Colorado.

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Colombia Plans to Buy Subsidiary of A&FP

American & Foreign Power Co may soon be moving out of Colombia. The company is presently negotiating to sell Compania Colombiana de Electricidad, of which it is the principal owner, to the Colombian government.

Several months ago, A&FP proposed the sale, and although negotiations are moving slowly, the government has accepted the basic idea, and no insurmountable difficulties are in the offing.

Compania Colombiana de Electricidad serves a population area of 1,080,000 people. It has better than 100,000 customers, principally in the cities of Barranquilla and Santa Marta on the Caribbean coast, and Buenaventura on the Pacific coast. The company generates about 86 Mw in two steam plants, seven hydro plants, and seven diesel plants.

A&FP's decision to leave Colombia came after a series of popular demonstrations against a company rate increase. The company had filed for the increase in 1958.

With the rapid growth of its service area, the electric power facilities of the company were becoming increasingly inadequate. Compania Colombiana de Electricidad claimed that the existing rates were not sufficient to make expansion of its plant economically feasible.

Last year, the government put the rate increase into effect. But Colombian citizens, chiefly in Barranquilla, who were already hot over the lack of power, exploded when they learned of the new rates. The demonstrations forced the government to suspend the increase for 120 days, and later, to suspend it indefinitely.

The reluctance to grant the increase, and the rapidity with which the rates were suspended, is a clear reflection of Colombian thinking when it comes to public utilities. While sympathetic to the company's difficulties, the government nevertheless seems to feel that a profit-making utility is not consistent with its social policy.

Social Policy Comes First

As Colombian President Alberto Lleras Camargo said at a luncheon in April of this year: ". . . in certain essential public services, foreign capital, which is obligated to produce high dividends and interest, cannot look after the obligations of a social policy or of economic development which we Colombians cannot overlook, because it is vital to us . . . These are cases of instruments of economic development which a state, devoted to the creation of better living conditions for its people, requires (to have in its hands) for the execution of social policy."

From the company's point of view, however, the rate increase was absolutely necessary. Colombia, like other South American nations, is taking a beating from inflation. And as costs rose, the utility, with fixed rates, found it increasingly difficult to meet them.

Colombia's cost-of-living index tells the story of its inflation. With 1953 equaling 100, the index rose to 117 in 1956, and to 174 in 1960. Wages rose to compensate for this jump in price. The nation's average hourly wage, 73¢ in 1953, is now at $1.38. A&FP's rates had been adjusted upward about 25%, but this was not nearly enough to cover the increase in costs.

Inflation also hit Compania Colombiana de Electricidad's ability to purchase equipment from abroad. As prices rose, the Colombian peso was naturally weakened against other currencies. In 1956, for example, the peso was quoted at 39.8¢ in US currency. Today it runs at about 11.5¢. This means that the company's earnings buy less than a third as much equipment abroad as they did in 1956 wherever that equipment has not changed in price.

With an inadequate system that had to be expanded, a rate increase was a must for the company. But such an increase did not fit with the Colombian notion of the function of a utility.

To solve the problem, A&FP offered to sell its properties. The Colombian government liked the idea. And unless some unexpected developments arise, A&FP will be leaving still another Latin American country.

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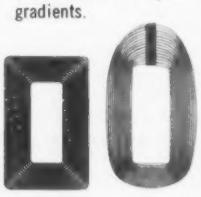

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